New Mass Storage: Hard Disk Drives And RAM Expansion

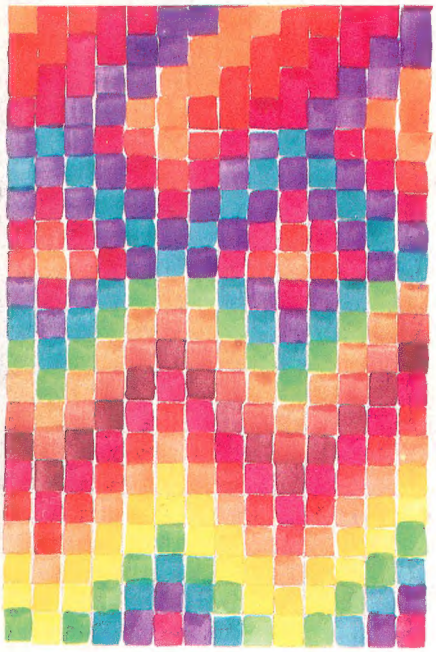
COMPUTE!'s GAZETTE

$3.00
May 1987
Issue 47, Vol. 5, No. 5
02220 $4.25 Canada

FOR **COMMODORE** PERSONAL COMPUTER USERS

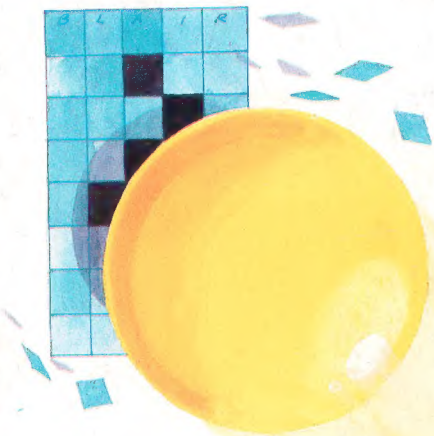
SpeedScript 3.2

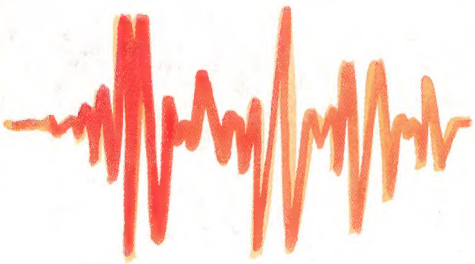
A complete word processor for the Commodore 64. The latest version of our most popular program ever. Plus three new support utilities: ScriptRead, SpeedSearch, and Date And Time Stamper



No-SYS Loader

The easy way to run, load, and save machine language programs on the 64.





Powerball

An outstanding—and addictive—multifeatured arcade-style game for the Commodore 64.

Dazzlers

Your text screen never looked like this. Fascinating animated graphics for the 64.

The Digital Voice:

Speech Recognition And Sound Synthesis

Find out how the latest products make your 64 an even more valuable tool.

Also In This Issue:

A Guide To Commodore User Groups, Part 1

Fast Boot For The 128

Hints & Tips: Time Savers

And More

05
0 71486 02220 6

"The Bard is Back!"

From impossible dungeons and split-second snares, the Bard and his party emerge. The Sceptre, so long forgotten, gleams with power like an exploding sun. Even Phenglei Kai, the ancient archmage, bows his head in awe.

"I smell serpents!" Slipfinger squeals, stealing away like the thief he is. Two arch-dragons slither out of the ground, their eyes burning with the relentless fury of treasure lost.

Protected behind the flame lizards, beyond the reach of normal weapons, a cackling wizard begins the eerie chants of a death spell. A spell that can finish the Bard and his party.

The time has come to battle-test the magic of the Destiny Wand – and reveal the awesome powers of The Destiny Knight.™

The Best Ever Dungeon Role-Playing Game

- 50% bigger than Bard's Tale.™
- An all-new story line.
- Six cities and a huge overland wilderness to explore.
- Dozens of new spells – 79 spells in all.
- New real-time dungeon puzzles. You have to get through them before the clock stops ticking.
- Summon and name monsters to become a permanent part of your party.
- More strategy in combat encounters – the weapons and spells you choose depend on the enemy's distance.
- A bank and casino.
- A starter-dungeon for building up your low-level characters.
- 6 guilds for easier game saving.
- Optional use of Bard's Tale characters. Bard's Tale experience not required.
- Cluebooks available for both Bard's Tale and Bard's Tale II.™

PHENGLEI KAI
Race: ELF
Class: Archmage
St:18 IQ:18 DX:18
Cn:18 LK:18
Lvl:18
Experience : 5010118
Gold : 0
Press Any Key...
The Guild
Character Name AC Hit Pts Spl Pts
0 WUMPI LS 447 447 0 0
1 TOADY ONE L+ 350 317 0 0
EL CID L+ 559 540 0 0
SAMPSON L+ 511 492 0 0
SLIPFINGER -3 78 67 0 0
PHENGLEI KAI -1 453 453 458 458

You get a new class of magic user – the Archmage. With 8 powerful spells like Heal All, Fanskar's Night Lance, and the awesome Mangar's Mallot.

Snarls of defiance are heard from 12 Kner Drones (10'), and 6 Pickpockets (10').
Will your stalwart band choose to (F)ight or (R)un?
Kner Drones
Character Name AC Hit Pts Spl Pts
0 WUMPI LS 447 447 0 0
1 TOADY ONE L+ 350 317 0 0
EL CID L+ 559 540 0 0
SAMPSON L+ 511 492 0 0
SLIPFINGER -3 78 67 0 0
PHENGLEI KAI -1 425 425 468 357

There are over 100 monsters, like this Kner Drone. Many animated. All dangerous.

DANGER: Troops beware! Ahead lies the real-time Puzzle-Snare. Proceed of thy own risk.
Maze of Dread
Character Name AC Hit Pts Spl Pts
0 WUMPI LS 447 447 0 0
1 TOADY ONE L+ 350 317 0 0
EL CID L+ 559 540 0 0
SAMPSON L+ 511 492 0 0
SLIPFINGER 1 78 67 0 0
PHENGLEI KAI -3 425 425 468 357

25 scrolling dungeon levels. All in color. All 3-D. Including 7 different Snares of Death, a new kind of real-time puzzle.

The Bard's Tale II

The Destiny Knight

from

ELECTRONIC ARTS™

Optional use of characters from Ultima III™ or Bard's Tale™

HOW TO GET IT: Visit your retailer, or call 800-245-4525 (in CA call 800-562-1112) for VISA or Mastercard orders. **To buy by mail**, send a check, money order, or VISA or Mastercard information to Electronic Arts, P.O. Box 7530, San Mateo, CA 94403. The price is $39.95 for the Commodore 64 version. Add $5 for shipping and handling ($7 Canadian). Allow 1-4 weeks for delivery. The Bard's Tale II and Electronic Arts are registered trademarks of Electronic Arts. Ultima is a registered trademark of Richard Garriott. Commodore is a trademark of Commodore Electronics Ltd. For a copy of our complete catalog, send 50¢ and a stamped, self-addressed envelope to Electronic Arts Catalog, 1820 Gateway Drive, San Mateo, CA 94404.

COMMODORE OWNERS... YOU ARE ABOUT TO BEGIN A WONDERFUL NEW LOVE AFFAIR!

NEW for C64!

Since the beginning of the computer boom, folks have been saying what they would *really* love is a program *anyone* can use to perform *everyday* tasks.

PARTNER 64, a cartridge-based product with eight convenient, *memory-resident* desktop accessories, does just that.

Like Sidekick*, PARTNER automagically suspends the existing program in your computer while you are using the PARTNER accessories. When you are through, press a button and PARTNER returns you to the point in your program where you left off.

ACCESSORIES AT YOUR COMMAND:

- **Appointment Calendar and Date Book:** Keep track of appointments and deadlines. At the press of a key, you'll be able to review your appointments for a day, week, or month. Months may be viewed in their entirety in a traditional calendar format, and then printed out.
- **Memo Pad:** Write yourself important notes. Print them out on paper or save them onto disk.
- **Name, Address and Phone Books:** Keep track of important names, addresses, and phone numbers. Available instantly, any time you use your computer.
- **Calculator:** A multi-function calculator with an optional "paper tape" that prints out your calculations on your printer.
- **Typewriter:** Turns your computer and printer into a traditional typewriter.
- **Envelope Addresser and Label Maker:** Use this feature and your name and address list to address envelopes or create mailing labels – quickly, without leaving the software you are working with.
- **Auto Dialer:** At your command, the computer will search through your list for the number you want, and automatically dial the number for you.**
- **Screen Print:** At the press of a key, the text (not graphics) of your computer display will be duplicated on your printer.

OTHER FEATURES:

- **SwiftDOS:** Allows you to access Commodore disk drive commands any time.
- **SwiftLock:** Enter your secret code before you leave your computer. The keyboard will be locked until you re-enter your code.
- **Extended Printer Control:** Allows you to send commands directly to your printer at any time.
- **SwiftLoad:** Allows your Commodore 1541 disk drive to load as fast as the Commodore 1571 disk drive.

Also available for the Commodore *128* computer!

Suggested Retail Prices:

- C64 (64K, 40 Column) . . $59.95
- C128 (128K, 80 Column) $69.95

Available at your favorite Dealer, or call Timeworks today!

TO ORDER CALL:
1-800-535-9497

FREE CUSTOMER TECHNICAL SUPPORT HELPLINE

MONEY BACK GUARANTEE
Details on every package

TIMEWORKS®

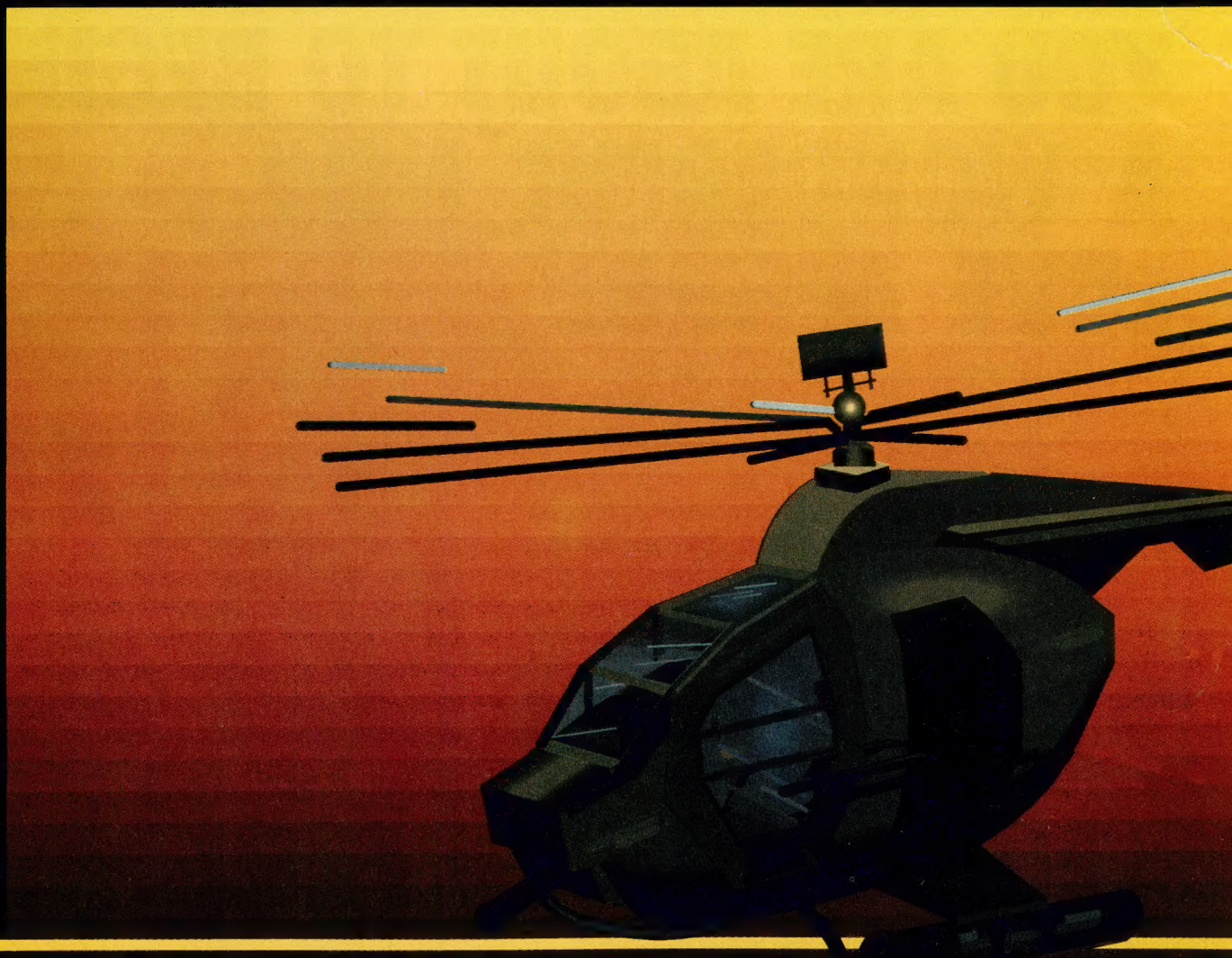
More power for your dollar

Timeworks, Inc. 444 Lake Cook Road, Deerfield, Il. 60015
312-948-9200

*Reg. trademarks of Borland Int.; Commodore 128 is a trademark and Commodore 64 is a registered trademark of Commodore Electronics, Ltd.

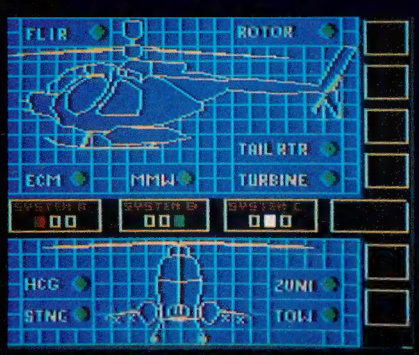
**An auto-dial modem is required to use the phone dialer feature.

©1985 Timeworks, Inc. All Rights Reserved.

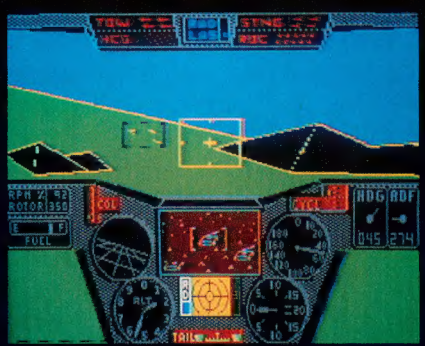


In a market full of helicopter simulations like Super Huey II, Gunship, and Infiltrator, it's nice to find a product like ThunderChopper that flies high above the rest!

Colonel Jack Rosenow USAF (Ret.), President of ActionSoft Corp., has the experience to provide all of the helicopter action and strategy you've been looking for! ThunderChopper incorporates the most advanced graphics, flight systems, and game-playing factors to provide a sensational balance of strategy and fun:



- Action-packed animated graphics include real 3D scenery and airborne threats. The competition's graphics just don't compare.
- A sophisticated instrument panel lets you scan all vital information at a glance whether performing combat, exploration or rescue operations. ThunderChopper's advanced instrumentation includes Forward-Looking Infra red, CO2 laser radar, zoom television, and ECM. Armament includes TOW and Stinger missiles, a Hughes Chain Gun, and Zuni rockets.
- Better program and documentation design gets you up flying exciting combat missions in minutes.



As Colonel Jack says: "ThunderChopper is the ultimate in helicopter action and realism. Nothing else even comes close. No other simulation can boast this much fun!"

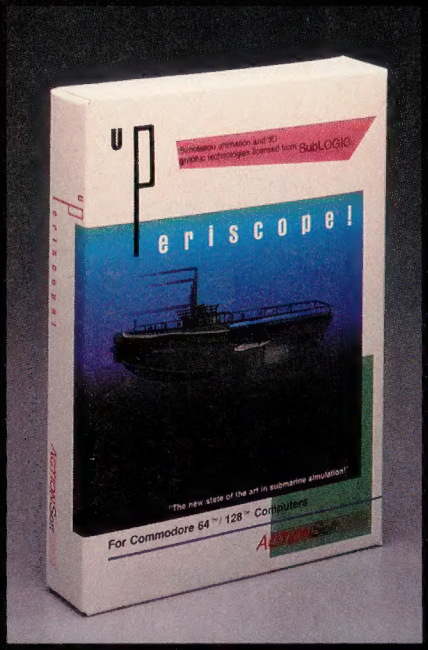
ThunderChopper

Simulation animation and 3D graphic technologies licensed from SubLOGIC

Up Periscope!

The new state of the art in submarine simulation. The superior strategic play action and 3D animated graphics of this simulation put it generations ahead of the pack.

See Your Dealer...
Or write or call us for more information. ThunderChopper and Up Periscope! are available on disk for the Commodore 64/128, Apple II, and IBM PC line of personal computers for the suggested retail price of $29.95. For direct orders please specify which computer version you want. Include $2.00 for shipping and specify UPS or first class mail delivery. Visa, MasterCard, American Express, and Diners Club cards accepted.



- $29.95 -
Better Engineering at a Better Price

© 1986 ActionSoft Corporation
3D Graphics and special effects courtesy SubLOGIC Corp.
Commodore 64 and Commodore 128 are trademarks of Commodore Electronics Ltd.
Apple II is a trademark of Apple Computer, Inc.
IBM is a registered trademark of International Business Machines Corp.

ACTIONSoft
GENERATIONS AHEAD IN STRATEGY ACTION SOFTWARE
122-4 S. RACE ST. URBANA, IL 61801
(217) 367-1024

WHICHEVER DOOR YOU CHOOSE, THE PRIZE IS FUN AND EXCITEMENT BEYOND YOUR WILDEST FANTASIES!

Your quest for the best fantasy game is over. You've found not one, but three...from SSI. The play and feel of each game may differ; but in terms of fun, excitement and challenge, all three are equally exhilarating, intense, and absorbing.

WIZARD'S CROWN™
Guide eight valiant adventurers on a perilous quest to recover the precious Wizard's Crown that lies imprisoned behind spell-woven walls in the ruins of Arghan. Armed with different skills and weapons, your characters must search for clues among the maze of streets, buildings and dungeons. When your heroes clash with the vile denizens of Arghan, you can let the computer resolve each battle quickly, or you can personally direct the action with a multitude of combat options.
On diskette for 64K Apple®, Atari®, C-64™: $39.95.

GEMSTONE HEALER™
This is the sequel to our best-selling *Gemstone Warrior™* in which you braved the horrors of the Netherworld and successfully recovered the magical Gemstone. To your dismay, you discover that the Gemstone has been damaged. Hence, you must return to the Demons' lair, locate the Healing Tools and heal the Gemstone. Don't worry if you haven't played *Gemstone Warrior* because everyone will enjoy GEMSTONE HEALER's fast-paced, action-packed excitement.
On diskette for 64K Apple®, C-64™: $29.95.

PHANTASIE II™
This role-playing game promises to duplicate the phenomenal success that the first *Phantasie™* achieved. In PHANTASIE II, the Dark Lord fashioned an evil orb that has enslaved your people. Command a band of one to six travellers to brave the Dark Lord's wrath, locate the orb and find a way to destroy it. If you've played the original *Phantasie*, you can transfer those same characters to this sequel. If you haven't, simply create new characters and embark on a thrilling mission!
On diskette for 48K Apple®, C-64™, Atari ST®: $39.95.

Now that you've had a tantalizing peek at the fantastic adventures beyond, will it be Door #1, Door #2, or Door #3? The best answer: Why, all three, of course!

To get started, you'll have to open another door, that of your local computer/software or game store.

If there are no convenient stores near you, VISA and MasterCard holders can order by calling **toll-free 800-443-0100, x335.** To order by mail, send your check to: Strategic Simulations, Inc., 1046 N. Rengstorff Ave., Mountain View, CA 94043. Be sure to specify the computer format of the game. California residents, please add applicable sales tax.

Add $2.00 to your order for shipping and handling. Allow 4-6 weeks for delivery. In the Continental U.S., U.P.S. Blue service (faster shipping time) is available for $4.00.

Apple, Atari/Atari ST and C-64 are trademarks of Apple Computer, Inc., Atari, Inc., and Commodore Electronics, Ltd., respectively.

SSI™

©1986 by STRATEGIC SIMULATIONS, INC. All rights reserved.

GAZETTE contents

May 1987 Vol. 5, No. 5

features

New Commodore Storage Devices *Selby Bateman*	16	*
The Digital Voice: Speech Recognition and Sound Synthesis *Kathy Yakal*	24	*
Making the 64 Talk *Todd Heimarck*	32	*
***SpeedScript* 3.2 for the Commodore 64** *Charles Brannon*	54	64
A Guide to Commodore User Groups, Part 1 *Caroline Hanlon*	72	*

reviews

Operation Terminal *Scott Thomas*	36	64
Thinking Cap *Robin Minnick*	38	64
Portal *Neil Randall*	39	64
Gunship *George Miller*	42	64

games

Unscramble *Mark Tuttle*	44	128/64/+4/16
Powerball *William Chin*	46	64

education/home applications

Cassette Sleeve Maker *David Ito*	52	128/64/+4/16
Computing for Families: Computers and Learning—Which Future for You? *Fred D'Ignazio*	78	*

programming

SpeedSearch *Tony St. Clair*	75	64
***SpeedScript* Date and Time Stamper** *Bob Kodadek*	76	64
ScriptRead *Buck Childress*	77	64
BASIC for Beginners: The Power of the ON Command *Larry Cotton*	80	128/64/+4/16/V
Machine Language for Beginners: Building Trampolines *Richard Mansfield*	82	128/64
Power BASIC: Easy ML Line Drawing *Paul Carlson*	83	128
Hints & Tips: Time Savers	86	128/64/+4/16
No-SYS Loader *Walter L. Smith, Jr.*	87	64
Dazzlers *Paul Carlson*	88	64
Fast Boot *Jim Allen*	89	128
Gameports: Joystick, Paddle, and Mouse *Jim Butterfield*	90	128/64

departments

The Editor's Notes *Richard Mansfield*	6	*
Gazette Feedback *Editors and Readers*	10	*
Simple Answers to Common Questions *Tom R. Halfhill*	79	*
Horizons: Alphabetizing *Todd Heimarck*	84	128/64/+4/16/V
Bug-Swatter: Modifications and Corrections	92	*

program listings

COMPUTE!'s Gazette Author's Guide	125	*
How to Type In COMPUTE!'s Gazette Programs	126	*
The Automatic Proofreader	127	128/64/+4/16/V
MLX: Machine Language Entry Program for Commodore 64	128	64
Advertisers Index	132	*

*=General, **V**=VIC-20, **64**=Commodore 64, **+4**=Plus/4, **16**=Commodore 16, **128**=Commodore 128

COMPUTE!'s GAZETTE is published monthly by **COMPUTE!** Publications, Inc., 825 7th Avenue, New York, NY 10019 USA. Phone: (212) 265-8360. Editorial offices are located at 324 West Wendover Avenue, Greensboro, NC 27408. Domestic Subscriptions: 12 issues, $24 POSTMASTER: Send address changes to *COMPUTE!'s GAZETTE*, P.O. Box 10957, Des Moines, IA 50340. Second class application pending at Greensboro, NC 27403 and additional mailing offices. Entire contents copyright ©1987 by **COMPUTE!** Publications, Inc. All rights reserved. ISSN 0737-3716.

COMPUTE! Publications, Inc. is part of ABC Consumer Magazines, Inc., One of the ABC Publishing Companies: ABC Publishing, President, Robert G. Burton; 1330 Avenue of the Americas; New York, New York 10019.

editor's notes

In this issue you'll find the latest version of the most popular program we've ever published: *SpeedScript*, a fast, full-featured, yet easy-to-use word processor. *SpeedScript 3.2* includes many of the improvements that you, the readers, have requested.

Elsewhere in this issue, you'll find three very helpful support utilities for *SpeedScript*, each of which is designed either to save you time or help better organize your *SpeedScript* text files.

If you enjoy games, we think you'll find "Powerball" irresistible. While it takes some time to become expert, this exciting game is novel, varied, and challenging enough for anyone to enjoy. Also, you'll want to take a look at "Dazzlers," a series of graphics programs for the 64 that animate the standard text screen, with some surprising results.

Readers who have been with us for some time are likely to agree that the quality of the articles and programs in this issue does not come as a surprise; rather it's part of a tradition established by Robert Lock, the founder of COMPUTE! Publications.

This past December Robert withdrew from the daily management of the company and accepted the position of Editorial Consultant. He will continue to provide the company with guidance and will assist, in particular, in the development of new products and services.

This change in editorial management gives us our first opportunity to publicly acknowledge his contributions to the growth and success of the company he founded and to the personal computing industry as a whole.

In all these years he has never given an interview or in any fashion moved his personality into public view. While some other industry leaders appeared more concerned at times with their personal image than with the health of their companies, Robert has always worked quietly behind the scenes. We can, however, with this editorial, recognize his contribution and thank him in a small way for his efforts.

He was in his early thirties when he had the idea of starting a magazine devoted to consumer computing. And in the past seven years COMPUTE!, under Robert's guidance, has grown into a highly successful publishing group—four magazines, over 150 books in print, and over 1,000,000 readers a month. COMPUTE! Publications has become a major contributor to the ongoing introduction of computing into the homes, schools, and businesses of America and elsewhere in the world.

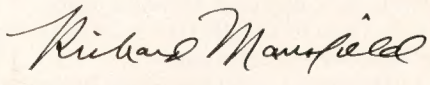
He saw early on that computers would have an immense impact. Starting in a storefront in Greensboro, with a handful of employees, he began working on the early issues of COMPUTE!. At that point, he was personally involved in every aspect of his young magazine: He pasted up galleys, called advertisers, contacted authors, and edited copy.

As the years went by, he continued to directly supervise the growing company in both its editorial and business activities. He has an intuitive grasp of business and finance combined with strong editing and writing skills. This combination of talents is as rare as it is powerful. And perhaps even more rare: He is an extremely clear thinker. Those of us who work closely with Robert have always been aware that he is remarkably accurate in his assessments on a wide range of topics.

We at COMPUTE! were not concerned during the notorious industry shakeout of 1984–85. We knew we would be among the survivors. In fact, COMPUTE!'s Gazette was introduced in the face of the shakeout, and became one of the strongest startups in magazine publishing history. We have gone on to publish a number of bestselling books and continue to feature some of the best programs, columns, and articles available on the subject of home and recreational computing.

It all began with a single idea, Robert's vision of how best to engage, entertain, and inform the reader about a powerful emerging technology that he saw would eventually affect every aspect of our lives. But a single idea, however accurate, rarely leads to the creation of a major publishing house. Thousands of others also began to see the importance of consumer computing by the end of the 1970s, and hundreds of publications were introduced. By 1983 there were 150 computer magazines competing for the attention of the reading public. Today there are only a few. That COMPUTE! Publications survived and flourished was largely due to Robert's strong leadership. The staff at COMPUTE!, and the readers who enjoy our efforts, are fortunate that he will continue to play a vital role, contributing to the direction of our publications as we grow.

In the coming years we will, with his help, preserve the traditions and values Robert established here. And we will expand, offering more comprehensive coverage as well as maintaining the quality of programs, tutorials, and features you've come to expect from COMPUTE! Publications.



Richard Mansfield
Editorial Director

The following programs are brought to you by an incredible series of events.

ming, diving, gymnastics and skeet shooting, just to name a few.

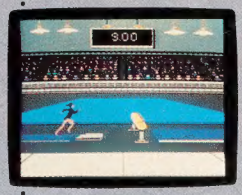
There's its equally acclaimed sequel, *Summer Games II.*™ Go for the gold in rowing, cycling, equestrian, fencing, the high jump, the triple jump, kayaking, and more.

Finally, there's the icy challenges of *Winter Games.*™ Wait'll you careen the tube in a bobsled. Fly the ski jump. Or choreograph an entire figure skating routine. You'll flip out over the hot dog aerials. And beg for mercy in the Biathlon. And coming next summer, our newest Games program. (Better get ready to hit the beach.)

Now, it may seem like a lot to handle.

But don't let world events get the best of you.

Sumo wrestling. A sport of ritual and tradition.



Gymnastics. A graceful display of balance, poise and concentration.

The Bobsled. One wrong move and it's right down the tube.

STAY ON TOP OF WORLD EVENTS.

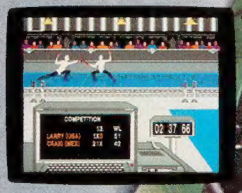
Over 30 of them, to be specific.

They're the unforgettable events of our best-selling Games series.

First, *World Games.*™ Eight international events ranging from Sumo wrestling to cliff diving. Bull riding to weightlifting. Even skiing the Chamonix slalom.

There's our enormously popular *Summer Games.*® Break records in track, swim-

Cliff Diving. In Acapulco, everyone falls for it.



Try your hand at Fencing.

Ride a bucking bull.

1 To 8 players. Amiga, Apple II & compatibles, Atari ST, C64/128, IBM & compatibles. Coming for the Apple IIGS.

1 To 8 players. Apple II & compatibles, Atari, C64/128.

1 To 8 players. Apple II & compatibles, C64/128, IBM & compatibles.

1 To 8 players. Amiga, Apple II & compatibles, Atari ST, C64/128, IBM & compatibles, Macintosh.

EPYX®

COMPUTE! Publications, Inc.
One of the ABC Publishing Companies

Publisher James A. Casella
Founder/Editorial Consultant Robert C. Lock
Editorial Director Richard Mansfield
Managing Editor Kathleen Martinek
Associate Publisher Selby Bateman
Editor Lance Elko
Assistant Editor Rhett Anderson
Production Director Tony Roberts

Editors
Tom R. Halfhill, Editor, COMPUTE!'s Atari ST Disk & Magazine; Stephen Levy, Editor, COMPUTE! Books Division; Ottis R. Cowper, Technical Editor

Assistant Editors
Gregg Keizer, John Shadle (Books); George Miller, Dale McBane (Technical); Philip I. Nelson (COMPUTE! Magazine); Todd Heimarck, (COMPUTE!'s Atari ST Disk & Magazine); Kathy Yakal, Assistant Features Editor; Tammie Taylor, Karen Uhlendorf, Karen Siepak, Copy Editors; Caroline Hanlon, Editorial Assistant; David Hensley, Submissions Reviewer

Editorial Programmers
Patrick Parrish (Supervisor), Tim Victor, Tim Midkiff, William Chin

Programming Assistants
David Florance, Troy Tucker

Administrative Staff
Executive Assistant, Debi Nash; Julia Fleming, Iris Brooks, Mary Hunt, Sybil Agee

Production
Irma Swain, Production Manager; Janice Fary, Art & Design Director; Lee Noel, Assistant Editor, Art & Design; De Potter, Mechanical Art Supervisor; Terry Cash, Carole Dunton, Typesetting

Artists
Robin Case, Kim Potts (Publications); Harry Blair, Illustrator

Associate Editors
Jim Butterfield (Toronto), Fred D'Ignazio (Alabama)

Customer Service
Diane Longo, Customer Service Manager; Jose Cruz, Dealer Sales Supervisor; Cassandra Green, Individual Order Supervisor

Receptionist, Anita Armfield

Warehouse Manager, John Williams

President James A. Casella
Vice President, Editorial Director Richard Mansfield
Vice President, Advertising Richard J. Marino
Vice President, Finance & Planning Christopher M. Savine

1987 Editorial Board
Richard Mansfield
Kathleen Martinek
Selby Bateman
Lance Elko
Tom R. Halfhill
Stephen Levy
Robert Lock, Founder and Editorial Consultant

Advertising Sales
Richard J. Marino, Vice President, Advertising Sales; Peter Johnsmeyer, Director of Advertising Sales; Bernard J. Theobald, Jr., Associate Advertising Director; Kathleen Hanlon, Production Coordinator

Sales Representatives

Jerry Thompson	415-348-8222
Lucille Dennis	415-348-8222
Tom Link	212-315-1665
Harry Blair	919-275-9809

Address all advertising materials to:
Kathleen Hanlon, COMPUTE!'s GAZETTE
324 West Wendover Ave., Suite 200, Greensboro, NC 27408

Sales Offices

Northeast	212-315-1665
Mid-Atlantic	212-315-1665
Southeast	919-275-9809

Sales Offices, Jules E. Thompson, Inc.
1290 Howard Avenue
Suite 303
Burlingame, CA 94010

Midwest	312-726-6047
Texas	713-731-2605
Pacific Northwest	415-348-8222
Northern CA	415-348-8222
Southern CA	415-348-8222
Arizona	415-348-8222
New Mexico	415-348-8222
Colorado	303-595-9299

MPA
Member
ABC
Audit Bureau of Circulations

COMPUTE! Publications, Inc., publishes
COMPUTE! ***COMPUTE! Books*** ***COMPUTE!'s GAZETTE***
COMPUTE!'s GAZETTE Disk ***Apple Applications***
COMPUTE!'s Atari ST Disk & Magazine

Editorial Office:
324 West Wendover Ave., Suite 200, Greensboro, NC 27408

Corporate Offices:
825 7th Avenue, New York, NY 10019

Customer Service:
P.O. Box 5038, F.D.R. Station, New York, NY 10150

Telephone: (In NY) 212-887-8525;
(In U.S.) Toll free 1-800-346-6767
Office Hours: 8:30 AM to 4:30 PM Monday–Friday

Subscription Orders and Inquiries
COMPUTE!'s GAZETTE
P.O. Box 10957, Des Moines, IA 50340

TOLL FREE
Subscription Order Line
1-800-247-5470
In IA 1-800-532-1272

COMPUTE!'s GAZETTE
Subscription Rates

(12 Issue Year): US (one year) $24. Canada, Mexico and Foreign Surface Mail $30. Foreign Air Mail $65.

The COMPUTE!'s GAZETTE subscriber list is made available to carefully screened organizations with a product or service which may be of interest to our readers. If you prefer not to receive such mailings, please send an exact copy of your subscription label to: COMPUTE!'s GAZETTE, P.O. Box 10958, Des Moines, IA 50950. Include a note indicating your preference to receive only your subscription.

Authors of manuscripts warrant that all materials submitted to COMPUTE!'s GAZETTE are original materials with full ownership rights resident in said authors. By submitting articles to COMPUTE!'s GAZETTE, authors acknowledge that such materials, upon acceptance for publication, become the exclusive property of **COMPUTE!** Publications, Inc. No portion of this magazine may be reproduced in any form without written permission from the publisher. Entire contents copyright © 1987 **COMPUTE!** Publications, Inc. Rights to programs developed and submitted by authors are explained in our author contract. Unsolicited materials not accepted for publication will be returned if author provides a self-addressed, stamped envelope. Where programs are included in an article submission, a tape or disk must accompany the submission. Printed listings are optional, but helpful. Articles should be furnished as typed copy (upper and lowercase, please) with double spacing. Each article page should bear the title of the article, date, and name of the author. **COMPUTE!** Publications, Inc., assumes no liability for errors in articles or advertisements. Opinions expressed by authors are not necessarily those of **COMPUTE!** Publications, Inc. **COMPUTE!** Publications assumes no responsibility for damages, delays, or failure of shipment in connection with authors' offer to make tape or disk copies of programs published herein.

PET, CBM, VIC-20, Commodore 64, Plus/4, 16, and 128 are trademarks of Commodore Business Machines, Inc., and/or Commodore Electronics Limited. Other than as an independent supplier of quality information and services to owners and users of Commodore products, **COMPUTE!** Publications, Inc., is in no way associated with Commodore Business Machines, Inc., or any of its subsidiaries.

On the Road to Moscow . . .

As the German Wehrmacht approached the open steppes around Smolensk, the invasion of the Soviet Union was on schedule. At this rate, the army would capture Moscow and throw the Russians out of the European continent by the time the snows fell.

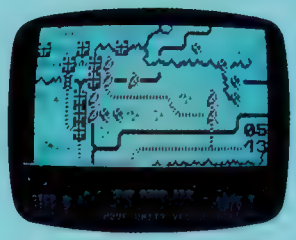
At the head of the Panzergruppe invading central Russia was General Heinz Guderian, the man who turned the potential of armor into the reality of Blitzkrieg warfare. Opposing him were masses of Soviet infantry and armor determined to defend their homeland, but untried in battle. With Guderian's armor and motorized infantry divisions approaching the ancient city, the stage was set for another encounter with the Nazi juggernaut.

Guderian simulates this critical campaign of World War II, using the acclaimed joystick-driven system from Gulf Strike. On the full-color scrolling map of central Russia, the German player must master Blitzkrieg tactics to encircle and overrun Soviet divisions and drive deep enough into Russia to make the capture of Moscow possible. At your command are infantry divisions, panzer regiments, motorized infantry, panzergrenadiers, even the 1st German Cavalry Division.

The Soviet player must work to counter the German threat, and make attacks capable of cutting off supply to the forward units. While your army is massive, it is also untrained. Soviet units begin play with a hidden strength revealed only at the moment of combat. Uncertainty is always present. The game becomes a tense contest as German units blunder into Soviet strongpoints, while Russian attacks can suddenly turn into a rout.

Guderian has a *solitaire option* allowing you to take command of either the German or Soviet armies, as well as overrun attacks, supply rules, Soviet leaders, rail movement and optional reinforcements. The rulebook introduces new players to historical gaming, explaining clearly concepts such as zones of control, supply, combat and movement. Planning map included.

The battle for Moscow was lost on the fields of Smolensk. Now is the time for you to re-create (and rewrite) history with **Guderian.**



German Panzers overrun Russian defenses west of Smolensk.

COMPLEXITY: Intermediate
SOLITAIRE SUITABILITY: Very high
TIME SCALE: 2 days per turn
MAP SCALE: 10.5 km.
UNIT SCALE: Regiments and divisions
PLAYERS: One or two
PLAYING TIME: 1½ to 3 hrs.

Guderian is ready to run on your Atari® 8-bit, Apple II family or Commodore® 64/128 home computer.
$30.00

Available at better computer, software and game stores or direct from

microcomputer games DIVISION
The Avalon Hill Game Company
A MONARCH AVALON, INC. COMPANY
4517 HARFORD ROAD • BALTIMORE, MD 21214
1-800-638-9292

Do you have a question or a problem? Have you discovered something that could help other Commodore users? We want to hear from you. Write to Gazette Feedback, COMPUTE!'s Gazette, P.O. Box 5406, Greensboro, NC 27403. We regret that due to the volume of mail received, we cannot respond individually to programming questions.

Where, Why, And How?

I have a Commodore 128 and a 1571 disk drive. I'm fascinated by graphics and sound. First of all, where did sprites get their name? Why can only eight sprites appear on the screen at one time? Finally, how can voice synthesis be produced without extra hardware? I just got Epyx's *Impossible Mission*, which has voice synthesis, and I can't figure out where it's coming from.

Sean Raburn

If you look in the 64 Programmer's Reference Guide, *you'll find that the section that gives the technical specs for the VIC-II chip calls sprites Movable Object Blocks (or MOBs for short). This term never really caught on. Commodore's own 64 documentation (user's manual and reference guide) uses the term* sprites. *Two computers that were available before the 64 had sprites. On the Texas Instruments TI-99/4, sprites are called* sprites. *On the Atari 400/800, they're called* player/missile graphics.

The VIC-II chip which handles graphics on the 64 is the reason for the eight-sprite limit. There could have been more if the chip had been designed to support more, but the designers chose to provide eight. There's a machine language technique which does permit more than eight sprites on the screen at the same time as long as no more than eight appear on the same raster line. (A raster line is one of the thin horizontal lines that make up a video display. A Commodore video display consists of 262 raster lines.) Using a raster interrupt, you can draw eight sprites at the top of the screen, then change their locations to the bottom of the screen before the raster arrives there, effectively producing 16 sprites.

The voice in Impossible Mission *and other such games was digitized, not synthesized. It was recorded and then turned into a series of numbers that represent the sound. By reading through the numbers and carefully changing the frequency and volume of the three voices of the SID chip, the program creates a sound effect that sounds like a voice. For more about speech synthesis and digitization, see the feature articles elsewhere in this issue.*

Talking And Listening

I don't seem to understand what *download* means. When you download a program, is it from *your* disk drive or from the *other person's* drive? I don't understand uploading either.

Also, can two computers upload or download to each other with a modem and a terminal program?

Frederick J. Carleton

If you're sending the program, you're uploading. If you're receiving it, you're downloading. The difference between uploading and downloading is like the difference between talking and listening. Whenever data is transferred between two computers, one computer is uploading and the other is downloading. A way to remember is to pretend the other computer floats above your TV or monitor. To send to the other machine, the program has to flow up (upload). To receive a program, it flows down (download).

If you have a modem and a terminal program, you can upload to and download from a bulletin board service (BBS), telecommunications service, or a friend who also has a modem. To transfer files with a friend, you should set one modem to originate and the other to answer. There may be an O/A switch on your modem or you may have to send a command from the terminal program. There are a number of transfer protocols—Xmodem or Punter, for example—that strive to eliminate errors in data transfers. However, you can use these protocols only when the computers on both ends of the connection have terminal software that supports the same protocol. One of you—whoever is sending—then uploads while the other person downloads. For more about this topic, see "The Fundamentals of Downloading" in our February issue.

New Commands, A Better BASIC

A recent issue contained an advertisement for a cartridge which supposedly adds 42 extra commands to 64 BASIC. What interested me was the PRINT USING command. As you know, this command is not available on the 64. Data formatting is such a chore.

What do you think of this program? Is similar software available through other manufacturers? Could "MetaBASIC" be modified to add such a command?

Gregory Skoutas

If you're a machine language programmer, there are many ways to modify BASIC to support a variety of new commands. BASIC programmers may find a number of commercial programs that add new commands such as PRINT USING.

Some add-on programs are cartridges, while others are programs you load and run from disk. Most specialize in one area of programming. There are enhancement packages that provide lots of commands for hi-res graphics, for example. Others add routines to speed up disk operations and give you new commands for reading directories and doing other things with a disk. Still others give you new commands for program flow and program control.

An unfortunate side effect of all this is that if you have a program that changes BASIC, the program you write won't run unless the enhancement is in memory. The PRINT USING command won't work in standard 64 BASIC, and if you write a program with PRINT USING, it won't work on a friend's computer if your friend doesn't also own the enhancement program.

The idea behind "MetaBASIC" is that it adds commands for debugging and testing, but it doesn't add commands that work while the program is running. While MetaBASIC is in memory, you can read a directory or renumber a program, but when you've finished the program, it will work on a 64 or 128 that doesn't have MetaBASIC in memory. Adding a PRINT USING command would be possible, but it would go against the concept of MetaBASIC.

Wanted: Pascal For The 64

In school I'm studying *Turbo Pascal* on the TRS-80. I was wondering if there was a *Turbo Pascal* operating system for the 64? If there isn't, who sells a Pascal operating system similar to *Turbo*?

Chuck Wheeler

An All Star Winning Team

With Unbeatable Prices and Quality

Be ahead of the game and don't let our low prices fool you, our joysticks have been produced under strict quality control.

ALL THREE JOYSTICKS CAN BE USED WITH ATARI 400, 800 AND 2600 HOME VIDEO GAME, COMMODORE VIC 20, 64, 128 COMPUTERS

TURBO CHARGE

- Rugged handle grip
- 4 light touch fire buttons
- 8 directional control
- Full 90 day warranty

$14.99

TERMINATOR

- Arcade-type grip
- Steel shaft handle
- Extra long 5 ft. cord
- Full 90 day warranty

$19.99

MICRO MASTER

- Built-in micro switch
- Built in precision control
- Tomorrow's technology available today
- Full 90 day warranty

$24.99

Looking for TOP QUALITY PERFORMANCE?
Look no further, phone or fill out order coupon below

ATTENTION DEALERS & DISTRIBUTORS

INQUIRE ABOUT OUR GOLD & PLATINUM PLAN
CALL TOLL FREE:

1-800-268-3770 ASK FOR OPERATOR 950

Credit card customers can order by phone, 24 hours a day, 7 days a week.

VISA MasterCard AMERICAN EXPRESS

OR SEND COUPON TO:

CAMERICA SALES & MARKETING CORPORATION
18325 VALLEY BOULEVARD, SUITE A
LA PUENTE, CALIFORNIA 91744

QUANTITY

___ Turbo Charge **14.99** _____
___ Terminator **19.99** _____
___ Micro Master **24.99** _____
TOTAL _____

☐ CHECK OR MONEY ORDER (SORRY NO C.O.D. ORDERS)
☐ AM. EXP.
☐ VISA ☐ MASTERCARD

ACCT. NO. _____
EXP. DATE _____

PLEASE PRINT CLEARLY

NAME _____
ADDRESS _____
_____
_____
CITY _____
STATE _____
ZIP _____
PHONE ( ) _____
SIGN HERE _____

Turbo Pascal *is an inexpensive and popular version of the Pascal language (it's not, strictly speaking, an operating system) made by a company called Borland International for computers that use the MS-DOS and CP/M operating systems.* Turbo Pascal *is not available for the 64. However, readers have reported that the 128 in CP/M mode can run the CP/M version of* Turbo Pascal.

There's no shortage of Pascal packages for the 64. We know of at least six: Super Pascal *(Abacus Software),* Zoom Pascal *(King Microware),* Kyan Pascal *(Kyan Software),* Oxford Pascal *(Systems Software/Oxford),* WATCOM Pascal *(WATCOM Publications), and* KMMM Pascal *(Wilserv Industries).*

For more about Commodore programming languages, see next month's GAZETTE.

Cursoring Around The Screen

I used to use this routine to move the cursor to the proper line before printing:

```
10 PRINT CHR$(19);:FOR P=1 TO
   N:PRINT:NEXT
```

The problem with this method is that I had to use trial and error to correctly position the cursor—there was no clear relationship between N and the line I wanted to print on.

I've switched to using

```
10 PRINT CHR$(19);:FOR P=1 TO
   N:PRINT CHR$(17);:NEXT
```

The cursor-down character works perfectly. Why the difference?

Robert M. Harvey

Type in this program and RUN it.

```
MG 1Ø PRINT"{CLR}";
BH 2Ø PRINT"Ø12345678901234567
      8901234567890123456 78";
GC 3Ø PRINT"{HOME}{5 DOWN}CURS
      OR CONTROLS"
RR 4Ø PRINT"{HOME}";:FOR P=1 T
      O 5:PRINT:NEXT P
BP 5Ø PRINT"PRINT STATEMENTS"
```

This program uses both strategies for positioning the cursor. First it uses PRINT statements to move down the screen, then cursor control characters. If you look carefully when the program runs, you'll see that both procedures work equally well in this case—both messages are printed on the same screen line.

To see why the first method is sometimes unpredictable, add another character to the long text string in line 10 of the program. RUN the program again. The routine that uses PRINTs puts a message down one line lower than the routine that uses cursor controls. This is because the PRINT uses all 40 columns of the screen.

When 40 or more characters are printed, two physical screen lines are joined to create one logical screen line. You can't tell the difference by looking at the screen, but the computer now considers the two lines as only one line. Any PRINT with 40 or more characters will change the "map" of the screen that holds the logical-line information. An empty PRINT statement always moves the cursor down by one logical line, whether that logical line is equivalent to one physical line or two.

Why does it happen? Consider what takes place when you type in a program line. A program line can occupy two screen lines on the 64. If the computer only could pay attention to one physical screen line at a time, full-screen editing would be impossible—you could change the part of the program line without the line number and press RETURN, but the computer wouldn't be able to recognize that line as a line of BASIC.

Since the PRINT and INPUT routines use the screen-editor routines, the difference between logical and physical lines applies when running BASIC programs as well as when entering them.

A Spritely 128

I know how to calculate sprite DATA statements, but I don't know how to display them with the 128's sprite commands. Could you please explain how to do this?

Roger Thinggaard

The 128 has an area of memory reserved for sprite definitions at 3584–4096 ($0E00–$0FFF). The 128's built-in sprite editor (which can be called by typing SPRDEF from immediate mode) stores sprites in this location, and BASIC 7.0's sprite commands assume that the sprites are defined in this area. There is enough room in this space for eight sprite definitions. If you use SPRDEF to create your sprites, you can begin using BASIC 7.0's special sprite commands without any problems. Unfortunately, your sprites will be lost when you turn off the computer's power. To save your sprites, use this line:

```
BSAVE "SPRITE",B0,P3584,P4096
```

Your program can load in the sprite definitions with a program line that looks like this:

```
10 BLOAD"SPRITE"
```

If you prefer to use a different sprite editor, or if you translate your sprites to DATA statements by hand, you can POKE your sprites into memory beginning at location 3584. Here's an example program:

```
XR 1Ø FOR T=3584 TO 3584+2Ø:RE
      AD A:POKE T,A:NEXT T
RP 2Ø SPRCOLOR 2,9
CC 3Ø SPRITE 1,1,1,Ø,Ø,Ø,1
CR 4Ø MOVSPR 1,1ØØ,1ØØ
XX 5Ø MOVSPR 1,45#1
AQ 1ØØØ DATA 85,85,85,1Ø6,128,
        1,11Ø,128,1,127,128,1,
        11Ø,128,1,1Ø6,128,1,65
        ,Ø,65
```

Line 1000 holds the data for one sprite. Line 10 POKEs it into memory. Line 20 sets the colors for multicolor sprites. Line 30 turns on the sprite. Line 40 puts the sprite at sprite position 100,100 on the screen. Line 50 starts the sprite moving.

More About The 1520

Several months ago, reader Anthony Wajda requested information about changing the device number of the 1520 printer/plotter. At that time, we did not have the instructions for making the change. Now, thanks to several of our readers, we can answer Mr. Wajda's question.

When it's shipped from the factory, the 1520 has a device number of 6. Commodore chose device 6 so it could be used with another printer which already had the standard printer device number, 4. Unfortunately, most programs expect the printer to be device number 4. To change the device number of the 1520, you must open the case (which will void your warranty, if it hasn't already expired). Be especially careful. Changing the device number involves soldering a trace on the circuit board. One slip with a soldering iron could ruin your 1520. If you are inexperienced in electronics, have a professional do the work for you.

First, unplug the printer from the wall socket. Then remove the four screws on the bottom of the printer case and remove the top of the case. Next, remove the four screws holding the circuit board in place and the two screws holding the heat sink. Separate the circuit board from the case and turn it over so that the green side is facing upward. Look for the largest IC chip on the board. It should be mounted on the lower left section of the board. Look at the bottom row of pins just to the right of center on the IC. You should see three "mushrooms" attached to three of the pins (pins 27, 28, and 29). You should also see two traces connecting the left and right mushrooms to a thick common trace. The 1520 is device number 6 because the trace between the middle mushroom and the common trace has been cut. If only the left trace were cut, the 1520 would be device 5 and if only the right trace were cut, it would be device 7.

To change the 1520 to device 4, you must connect the middle mushroom to the common trace. The first step is to scrape the green coating from the mushroom head and from the green area of the common bar (solder won't adhere to the coating). Finally, place a drop of solder on the two scraped areas and bridge the gap between the two. Caution! Do not leave solder traces anywhere else on the circuit board; this could damage your printer.

Put the printer back together and test your changes. You should now have a printer/plotter that responds to commands sent to device 4.

YOU TOLD US WHAT THE BEST COMPUTER BASEBALL GAME WOULD HAVE . . .

"Great graphics"

"I want to play in the series!"

"Relief pitchers —and subs"

"I want to be able to throw a lot of different pitches."

"I like to slide —even head first."

"Let me see what's happening on the whole field."

"Put me right at the plate when I'm batting."

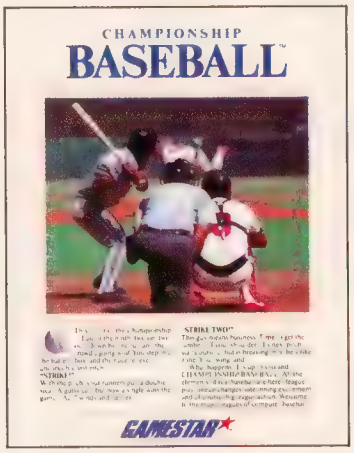
HERE IT IS.

CHAMPIONSHIP BASEBALL™

With 4 Divisions, 24 Teams, and the Championship Series

You've been asking for the best in computer baseball games, and you want it *all*—graphics *and* features. We've heard you, and **Gamestar's** *Championship Baseball* delivers. No other product gives you the complete sport of baseball like *Championship Baseball:*

- Player Draft, complete with reserves.
- Setting your starting lineup.
- Batting Practice, Exhibition Game and League Play options.
- Each division is tougher than the last, so there's always a new challenge.

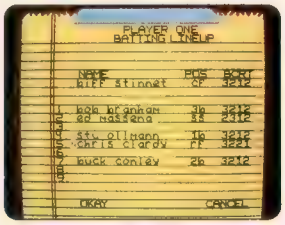


- You control all the action on the field—pitching (8 different pitches), hitting, catching, outfield relays, base running, even sliding under tags.
- Player substitutions can be made throughout the game.
- Division, playoff and championship series play.

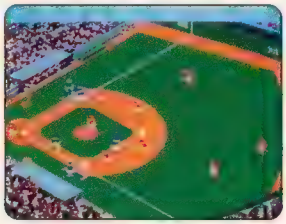
All this and much more in the most complete baseball program available. When you're ready to step into the major leagues of computer baseball, Championship Baseball's your ticket. Nobody else gives you more.

Available now for IBM PC, Tandy 1000, Apple IIe, IIc, Commodore 64/128, Amiga, Atari ST and 100% compatible computers.

Select your players from the talent pool, based on their characteristics and skill ratings. Name them after today's stars, or anyone you want.



Determine the batting order that will have the best chance against your opponent.



Batting window disappears when the ball's in play, so you can see continuous action.

GAMESTAR™

Amiga screens shown; other systems may vary. Gamestar is a trademark of Activision, Inc. Commodore 64, 128 and Amiga are trademarks of Commodore Electronics Limited.
IBM is a trademark of International Business Machines Corporation. Tandy is a trademark of Tandy Corporation. Atari and ST are trademarks of Atari Corporation. Apple is a trademark of Apple Computer.
Activision is the registered trademark of Activision Inc. © 1987, Activision Inc.

INPUT Doesn't Like Commas

Why is it that whenever you type a : or ; in an INPUT statement, the computer responds with ?EXTRA IGNORED, and then, when you print the data in the string variable, it cuts off everything past the colon or semicolon? Is there any way to prevent this?

Mark Jacobson

INPUT with semicolons works properly. You may have been thinking of the problem with commas. If you enter the one-line program ***10 INPUT A$: PRINT A$*** *and run it, you'll see the following results. What you type is in the left column. The right column shows what prints out.*

```
ABC,DEF   ABC
ABC;DEF   ABC;DEF
ABC:DEF   ABC
```

The ?EXTRA IGNORED error message appears when you use a comma, but not when you use a semicolon or colon. This error is one of the rare ones that doesn't stop the program. After the message prints, the program continues to the next command.

There's a good reason why commas cut off input. Within INPUT statements and DATA statements, commas are used to separate individual items. Change the example program to ***10 INPUT A$,B$: PRINT A$: PRINT B$*** *and then enter ABC,DEF. As you can see, a single typed line can assign strings to two different variables. Run the program a second time and type just ABC at the ? prompt. The program wants two variables, so it gives you a second prompt (two question marks).*

What seems like a problem with commas is really a feature of the INPUT statement, one that's valuable when you need to input several variables at once. The comma doesn't act as a comma character, it's a separator.

Colons also separate members of a list. The one-line programs above used colons to put more than one command in a program line. There's a machine language routine called CHRGET built into the 64. It's an all-purpose subroutine which gets characters from direct-mode commands, from program lines, while a program is running, and during INPUT. The CHRGET routine flags colons, which mark the end of one part and the beginning of the next. Since colons indicate the end of a section of a line, they also terminate an input from the user.

You may find situations where you want to include a comma or a colon within a string. One solution is to use GET instead of INPUT. Another is to start your string with a quotation mark, typing "ABC,DEF instead of ABC,DEF. By putting the string inside quotation marks, you'll be able to include these two problem characters. The quotation marks won't appear when the program prints the string. The only character that will prematurely terminate the string is a CTRL-@, because it's interpreted as a CHR$(0)—one of the other terminating characters.

Starting the string with a quotation mark is easy enough to remember if you're the only person using the program. But if others might run your program, you can force the quotation mark to print—on the 64—by putting ***POKE 631,34: POKE 198,1*** *just before the INPUT statement.*

Locating Custom Characters

I want to use custom characters for the 64 at locations 2048–6143 and I need to know what each address is used for. My memory map just says 2048–40959 are used for BASIC programs and variables. I know that locations 2048–2056 are the @ character, 2057–2065 are the letter *A*, 2066–2074 are *B*, and so on. I see the pattern, but could you list the rest of the addresses for me?

Tim Bankes

In the back of the manual that came with your 64 is an appendix that lists screen codes. When you copy characters from ROM to RAM, the characters appear in exactly the same order. Since each character uses eight bytes, multiply the number of the screen code by eight and add it to the address where you've put the custom characters. The letter T *is screen code 20, so the data for its shape starts at an offset of 20 times 8, or 160, from the beginning of the character set. Add 2048 and 160—the result (2208) is where the letter* T *begins. The heart shape is screen code 83, so it would start 664 bytes past 2048.*

Each character set contains 256 characters. The first 128 are listed in the appendix of screen codes. The final 128 are the reversed versions of the first 128 characters. Because there are 256 characters and each shape uses eight bytes, a complete character set takes up 2048 bytes.

A note about your math: Although a character takes eight bytes of memory, that doesn't mean that the first one runs from 2048–2056. It might look like eight numbers, but it's really nine. The first character uses the eight bytes from 2048–2055, the second runs from 2056–2063, and so forth.

There are two important facts about memory management that you should keep in mind if you plan to put the character set at 2048–4095. The first is that the VIC-II chip, which handles graphics on the 64, won't allow you to put characters between 4096–8191 or 36864–40959, because it sees the shadow of the ROM character set there. You can't store video information such as sprites or hi-res screens in these areas, either. If you keep the custom characters at 2048, you're safe. The second thing to watch for is that BASIC programs normally start at location 2049. To put characters at 2048, you'll need to move the start of BASIC up out of the way. ***POKE 43,1: POKE44,16: POKE 4096,0:NEW*** *will relocate the BASIC text area to 4097.*

The Absent-Minded Professor

I'm having a problem accessing the RAM under Kernal ROM from within a machine language program on my 64. I've narrowed the problem down to the modification of memory location 1 from 55 ($37) to 53 ($35). Included is an example. Do you have any idea what is causing the lockup?

Kenneth Taran

Imagine an absent-minded professor who conducts brilliant research in his laboratory. He gets so wrapped up in the work, he forgets to eat meals. Three times a day, an alarm goes off in the kitchen downstairs and an assistant prepares some food to bring up to the professor.

Within the 64, the chip that does most of the work is called the 6510—and it's an absent-minded professor. Sixty times a second (50 on European 64s), a second chip, the Complex Interface Adapter, has to nudge the 6510 and tell it to do some things like checking to see if a key has been pressed and blinking the cursor. The CIA #1 alarm clock generates an interrupt request (IRQ) and the IRQ sends the 6510 to an IRQ-handler routine where the keyboard is scanned and other chores are taken care of.

When you POKE (or STA) a 53 to memory location 1, the ROM at $E000–$FFFF is turned off and the RAM underneath is enabled. There's nothing wrong with switching ROM to RAM, except that the vector to the IRQ-handler routine (plus the handler itself) is located there. Within 1/60 second, an interrupt occurs and the 6510 tries to jump to the subroutine that does the housekeeping chores. But the subroutine is gone, because ROM has been replaced with RAM, which contains a series of random bytes. In an attempt to execute these instructions which aren't instructions, the computer locks up.

The solution is to disable IRQs with the machine language SEI (SEt Interrupt disable) instruction. You can reenable interrupts with CLI (CLear Interrupt disable). Place the SEI just before you store a 0 to bit 1 of location 1. When you're done accessing memory under ROM, store a 1 to bit 1 and then CLI. Note that SEI (Set) turns off the interrupt alarm clock and CLI (Clear) turns it on again.

Amiga screen

SO REAL IT HURTS

GFL Championship Football™

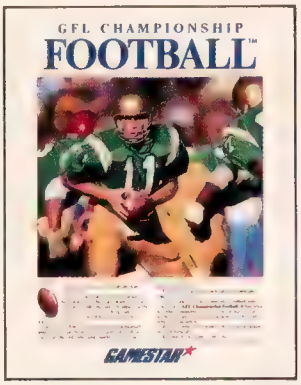
The way computer football *should* be.

Other football games put you in the grandstands, looking down on the action. Now see what it's like from the *player's* perspective—looking out of your helmet at an angry linebacker headed straight for you, and no blockers in sight.

With **GFL Championship Football,**™ you've got the first football simulation that actually takes you down on the field, taking the hits and making the plays. And it's more than just a pretty picture—you really get the feel of *playing* football.

No other football simulation gives you so many features:

- *In-the-helmet perspective* puts you at ground level on the playing field.
- *Scrolling-screen animation* moves you up and down the playing field.
- *Realistic sound effects* let you hear everything from the quarterback calling the signals to the sound of your own footsteps.
- *Team selection screens* allow you to set the playing style of your team and that of your opponent.

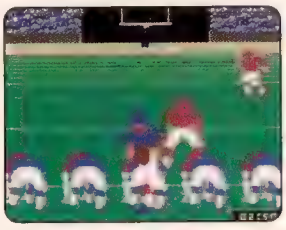


Whether you're taking on bone-crunching action against a friend, or going up against any of the 27 computer-controlled teams in the **GFL**, this is the one that puts you where the action is!

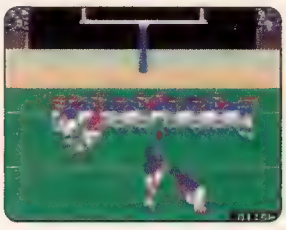
Available now for the Commodore 64/128.
Coming Soon for the IBM PC/PCjr and Tandy 1000, Apple II, Amiga, Atari ST and 100% compatible computers.

Amiga screen

Commodore 64-128 screen



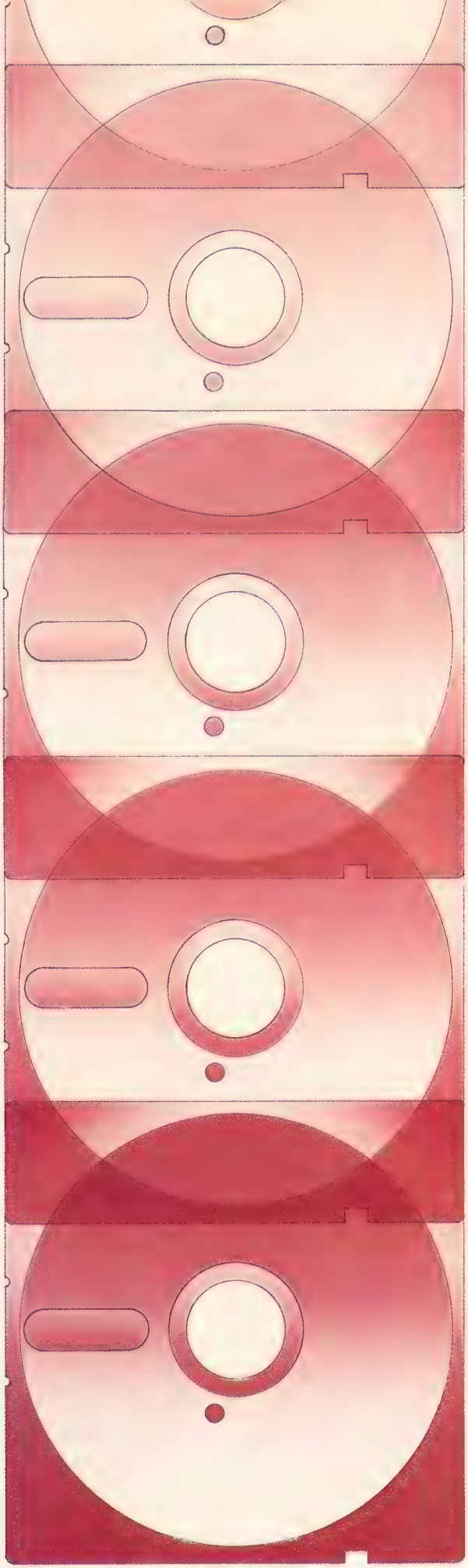
Commodore 64-128 screen



Commodore 64-128 screen

GAMESTAR™

Gamestar is a trademark of Activision Inc. Commodore 64, 128 and Amiga are trademarks of Commodore Electronics Limited. IBM PC and PCjr are trademarks of International Business Machines Corporation. Tandy is a trademark of Tandy Corporation. Atari and ST are trademarks of Atari Corporation. Apple is a trademark of Apple Computer. Activision is the registered trademark of Activision Inc. © 1986 Activision Inc



New Commodore Storage Devices

Selby Bateman, Features Editor

New data-storage devices for the Commodore 64 and 128 offer a variety of options beyond the 1541 and 1571 disk drives. Here's an overview of what's available, along with some considerations about how and why you may want to use them.

The Commodore 64 and 128 have already proven to be among the most popular and successful personal computers ever marketed.

The 64, five years old and going strong, has an installed base of several million. And the new 64C, with its *GEOS* operating system and applications, promises to continue that success. Sales of the 128, a machine first announced as recently as January 1985 and only widely available a few months later, already number more than a million.

One of the reasons for their continuing popularity is the relatively inexpensive and dependable disk drives that have helped to make the two computers more attractive.

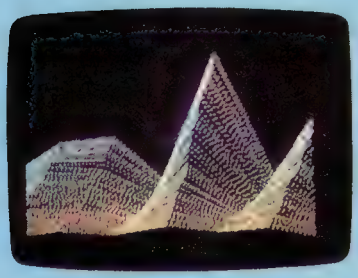
Consider the 64's 1541. Despite criticisms about its lack of speed (512 bytes per second) and its limited memory capacity (160K), the 1541 was a remarkable bargain when introduced with the 64 in January 1982. Even at the original retail price of $600, the 1541 offered 64 users a significant storage device that far surpassed the popular Datassette tape recorders used by many 64 and VIC-20 computer owners. Of course, the price quickly dropped to half that, and today 1541 drives can be bought in some places for as little as $150.

The 128's 1571 drive is also a perfect fit, but for another reason: It's versatile enough to work in three different modes without the user having to make any physical modifications to the drive. To really get the most out of a 128 computer, you have to use the 1571.

The 1571 does its job at one of three different speeds: 1571 mode for the 128, 1541 mode for the 64 or 128, or CP/M mode. With the 128's ability to work in serial fast

GET UP TO 200 FUN-FILLED PROGRAMS EACH YEAR—

when you subscribe now to COMPUTE!'s Gazette



Subscribe to COMPUTE!'s Gazette today through this special introductory money-saving offer, and you'll be getting a lot more than just another computer magazine. That's because each issue of COMPUTE!'s Gazette comes complete with up to 20 all-new, action-packed programs.

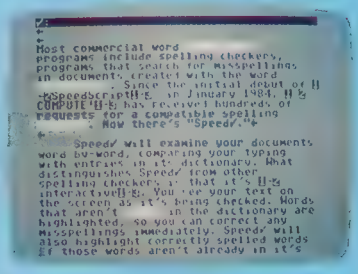
Subscribe now and you can depend on a steady supply of high quality, fun-filled programs for your Commodore computer—programs like Disk Editor, Mini-Filer, Arcade Baseball, Budget Planner, Sound Designer, *SpeedScript*, and hundreds of other educational, home finance and game programs the entire family can use all year long.

The superb programs you'll find in each issue are worth much, much more than the low subscription price.

And there's more to COMPUTE!'s Gazette than just exciting new programs. Month after month, the superb articles in COMPUTE!'s Gazette deliver the latest inside word on everything from languages to interfaces...from programming to disk drives.

Whether you're a novice or an experienced user, COMPUTE!'s Gazette is the magazine for you. So subscribe today. Return the enclosed card or call 1-800-247-5470 (in Iowa, 1-800-532-1272).

Do it now.



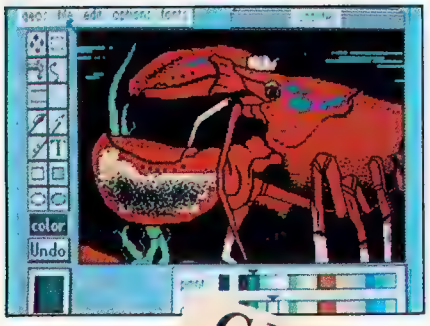
ACT NOW AND SAVE!

COMPUTE!™ Publications, Inc. abc

One of the ABC Publishing Companies

If attached order card is missing, write: COMPUTE!'s Gazette P.O. Box 10955, Des Moines, IA 50950

IF YOU STILL THINK CO
PLAY AROUND



GEOS $59.95

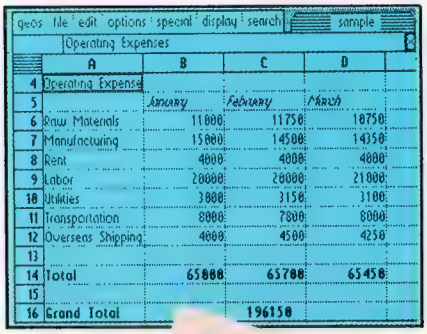
The Graphic Environment Operating System that opens up a whole universe of new possibilities for Commodores. With geoWrite, geoPaint, fast-loading diskTurbo and support for all GEOS-compatible applications.

FONTPACK 1 $29.99

A collection of 20 more fonts for use with GEOS applications, in various shapes and sizes for more expressive and creative documents.

DESKPACK 1 $34.95

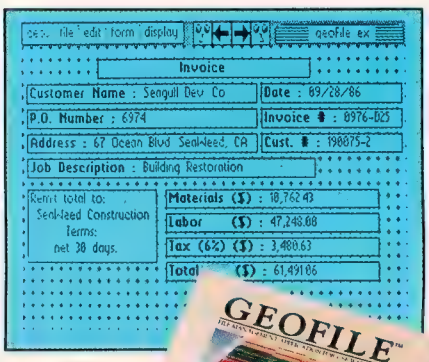
Four GEOS-compatible applications: Graphics Grabber for importing art from Print Shop,™ Newsroom™ and Print Master™ graphics; Calendar; Icon Editor and Black Jack Dealer.



	A	B	C	D
4	Operating Expense			
5		January	February	March
6	Raw Materials	11000	11750	10750
7	Manufacturing	15000	14500	14350
8	Rent	4000	4000	4000
9	Labor	28000	28000	21000
10	Utilities	3800	3150	3100
11	Transportation	8000	7800	8000
12	Overseas Shipping	4000	4500	4250
13				
14	Total	65800	65700	65450
15				
16	Grand Total		196150	

GEOCALC $49.95

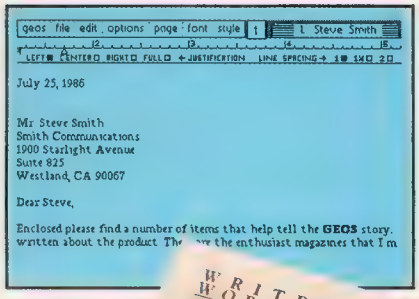
The GEOS-compatible, number-crunching spreadsheet for tracking and analyzing numerical data. Create your own formulas, perform calculations for anything from simple geometry to "what if" cost projections.



GEOFILE $49.95

The GEOS-compatible database manager that sorts, edits and prioritizes whatever data you feed it. You fill out the "input form," specify your command, and geoFile takes it from there.

MMODORES ARE TOYS, WITH THESE.

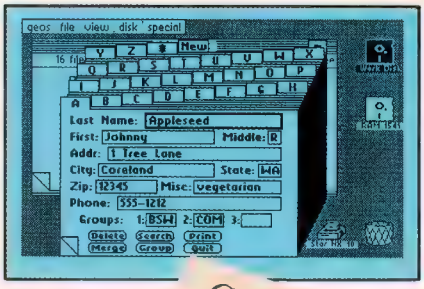

geos file edit options page font style
Steve Smith
July 25, 1986
Mr Steve Smith
Smith Communications
1900 Starlight Avenue
Suite 825
Westland, CA 90067
Dear Steve,
Enclosed please find a number of items that help tell the GEOS story.

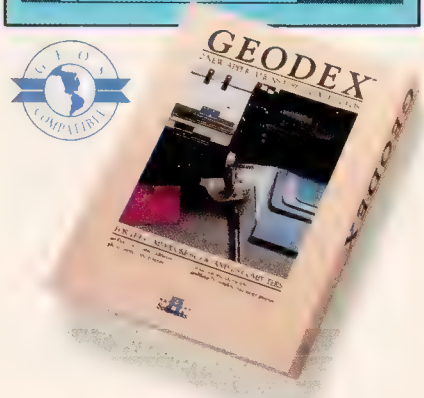
WRITER'S WORKSHOP $49.95

All the GEOS-compatible tools a writer needs, including geoWrite 2.0 with headers, footers and features to justify, center, search and replace text. Includes a Text Grabber (for converting text from programs like Paper Clip™), geoMerge and LaserWriter printing capability.

GEODEX $39.95

The GEOS-compatible directory that allows you to create lists by name, address, phone number, etc. Includes geoMerge to customize form letters and invitations.





GEOPRINT CABLE $39.95

The six-foot cable that speeds up printing because it's parallel—not serial. Connects easily to Commodores with fewer wires and no interface box.

To order call 1-800-443-0100 ext. 234
(California residents add 7% sales tax.)
$2.50 US/$5.50 Foreign for shipping and handling. Allow six weeks for delivery.

Commodore and Commodore C64 are trademarks of Commodore Electronics, Ltd. GEOS, geoWrite, geoPaint, geoCalc, geoDex, geoMerge, geoFile, Deskpack 1, Fontpack 1, Writer's Workshop and Berkeley Softworks are tradenames of Berkeley Softworks Print Shop, Newsroom, Print Master, and Paper Clip are tradenames of companies other than Berkeley Softworks

Sooner or later, you're going to discover that there's more to Commodores than fun and games.

You're going to discover power.

Not the kind of power that blasts aliens out of the galaxy. But the kind that whips through boatloads of data in seconds. The kind that crunches numbers and drafts documents like child's play.

The kind you find in GEOS.

Every GEOS application can take your Commodore from "mastering the universe" to a university master's degree, with all kinds of advanced capabilities that function at hyper-speeds you never imagined possible.

So if you're tired of toying with technology, try playing around with GEOS. Once you feel its power, you'll know that for anyone who still thinks Commodores are toys, the game's over.

Berkeley Softworks

The brightest minds are working at Berkeley.

mode as well as the slower 64 mode, its owners get three different computers working with data storage in three different manners.

Despite the successes of the 1541 and the 1571, Commodore recently introduced two new data storage and manipulation devices for the 64 and the 128. And a handful of third-party manufacturers continue to sell their disk drives and quick-load programs.

Expanding Memory

One of Commodore's two new devices is the 1764 RAM expander cartridge, which was announced at the Winter Consumer Electronics Show in January (see last month's issue). This long-awaited expansion module adds 256K of memory to the 64, plugging into the expansion port on the rear of the computer. Priced at about $129, the RAM expander offers 64 users four times the available memory. The original designers of the 64 could scarcely have envisioned such an add-on back in 1981 when they were building the computer.

For 64 owners, the RAM expander offers several potential options, each of which holds its own attraction, depending on the buyer's preferences.

For example, programmers in BASIC or machine language now have a vastly expanded playground for their programs. Learning to use the extra RAM efficiently and creatively will be challenging and—in the long run—can result in even more sophisticated programs.

Commodore provides two disks with their system. The first sets up the extra memory as a RAM disk, an area of memory that serves as another disk drive as long as the computer is turned on. The second disk provides RAM disk capability for the *GEOS* environment, as noted below. Treating the RAM as a disk allows easy and quick access of data for both BASIC and machine language programmers. For example, adventure games that have to access the disk drive at every turn could be rewritten to get the data from the expansion memory instead.

But the added RAM can help programmers do more than just speed up current programs—whole new techniques are possible. Full-screen realtime animation is one of the most exciting possibilities. Thirty-two 8K hi-res screens can be stored in the 1764 cartridge. Displaying these pictures sequentially allows 32 frames of high-quality animation.

Any data that uses a lot of memory—sound data, text, sprite and character definitions—can be stored in the expansion and moved into the main RAM when needed. For top performance, ML programmers may choose to bypass the RAM disk software and use the memory directly. BASIC programmers are likely to stick with the provided interface.

Easier, Faster *GEOS*

As mentioned above, the new RAM expander also brings a much faster, more efficient, and easier usage to Berkeley Softworks' *GEOS* operating system and applications. Commodore has named *GEOS* the official operating system for the 64. If you're a beginning 64 or 128 user who's not yet familiar with *GEOS*, you're likely to become aware of it very soon.

GEOS brings to the 64 the icons, windows, and drop-down menus that are a part of such graphics-oriented user interfaces as those on the Macintosh, the Atari ST, and the Amiga. Beyond that, Berkeley is making available a host of applications and utilities that transform the 64 into a very different machine.

The only drawback to the *GEOS* system so far has been that the 64's limited memory capacity required *GEOS* users to go through more disk access and manipulation than many people found comfortable. But with 256K of additional memory, *GEOS* users can now create a RAM disk—an area of memory within the computer that acts like an extremely fast disk drive. So, instead of having to load, save, and reload data from the 1541 drive, *GEOS* users can have near-instantaneous access through a RAM disk. Then, before turning off the computer, users can store the contents of the RAM disk in the 1541.

In the long run, if the 1764 RAM expander proves to be very popular among 64 users, it's possible that software companies will begin marketing some software packages that fully use the additional 256K. Imagine the kinds of screen graphics that could be used in games, or the speed-up and power of some applications when used with a RAM disk. However, all of that depends on the percentage of 64 owners who buy the RAM expander.

Last year, Commodore introduced two RAM expander cartridges for the 128: the 1700, with 128K; and the 1750, with 512K. They're proving to be very popular, and the new expansion module for the 64 is also likely to attract a very positive reaction among users. (For more on the 128 RAM expanders, see "RAM Expansion for the 128" in the March issue.)

Is The Future 3½?

Commodore also recently announced a 3½-inch disk drive for the 64 and 128. The 1581 drive, priced at under $400, offers Commodore users not only more data storage capacity, but significantly faster disk access for 64 users.

For example, the 1541 disk drive is a single-sided, single-density device that can store up to 160K of information on one disk. The 1571 drive can be used in a double-sided mode that contains up to 320K of information on a disk.

But the new 3½-inch drives are double-density, double-sided media with a total capacity of 808K—five times the storage of a 1541 disk and 2½ times the storage of a 1571 double-sided disk. Obviously, a Commodore 64 with a RAM expansion module and a 1581 3½-inch disk drive becomes a much more powerful and versatile computer.

But will software manufacturers produce their programs for the 64 on a 3½-inch-disk format? In order for that to happen, the software developers must first see an installed base of 3½-inch disk drives that's large enough to allow them to make a profit. Building a base of 64 owners who use the new disk drive will take time, of course, so it's not likely that much 64 or 128 software will emerge on 3½-inch disks during the next few months.

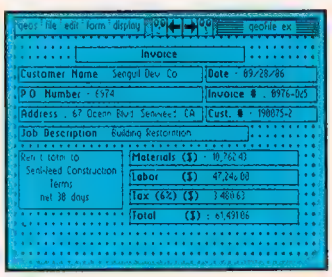
In the long run, however, that could change. The new 3½-inch disks have become increasingly popular. They offer faster speeds, a more durable shell, and greater memory capacity. These small, rigid disks are used with the Amiga, the

BY THE TIME SHE GETS TO "PHOENIX," HE'LL BE SLEEPING.

Having thousands of facts is one thing. Finding the ones you need is another. Which is why you should consider buying geoFile. The easy-to-use database manager for GEOS-equipped Commodores.

Whether they're receivables or recipes, once you have geoFile, you can fly through facts in seconds, clicking and picking the ones you want, just the way you want them.

It's as simple as filling out a form.



The geoFile "form" organizes all kinds of information. Like names, numbers, rates of objects' acceleration when dropped from two-story buildings—you name it. As much as you can fit on a printed page.

Once your data is in, the real fun begins.

You want names of bus drivers? From Arizona? Under five foot six? Between the ages of 33 and 35? With incomes of $22,396 or more? Who sneezed in June?

Just click your mouse and watch geoFile go to work. Searching. Sorting. Comparing and listing the data alphabetically. Or numerically. Or in whatever priority your form specifies.

You can put the data into form letters and lists with geoMerge. Or into math functions, with geoCalc. Or if you really want to get fancy, you can display your information graphically with geoChart.

And geoFile does it all in seconds.

Now, with all that in mind, what are you going to do—spend a few bucks on geoFile?

Or spend all night wishing that you had?

To order call 1-800-443-0100 ext. 234

geoFile $49.95

(California residents add 6.5% sales tax.)

$2.50 US/$5.50 Foreign for shipping and handling. Allow six weeks for delivery.

Commodore and Commodore C64 are trademarks of Commodore Electronics, Ltd
GEOS, geoFile and Berkeley Softworks are tradenames of Berkeley Softworks.

GEOFILE

Berkeley Softworks

The brightest minds are working at Berkeley.

ST, the Macintosh, and with a host of portable computers. Apple Computer now offers a Unidisk 3½-inch drive for the Apple IIe, IIc, and IIGS computers. And IBM will reportedly be using the 3½-inch drives in its next generation of computers.

Quick-Loading The 1541

Long before Commodore introduced the latest data storage devices, other companies began providing alternative disk drives, including hard disks, as well as devices or software that speed up the access time between the 64 and the 1541.

Among the most popular and least expensive ways of speeding up the 1541 are the quick-load cartridges or programs available from several companies. These generally work by increasing the transfer rate of data between the 64 and the 1541.

Included in this list are the the 1541 Flash! hardware-based system ($99.95) from Skyles Electric Works (231E South Whisman Rd., Mountain View, CA 94041), the MACH-5 disk and cartridge-based system ($34.95) from Access Software (2561 South 1560 West, Woods Cross, UT 84087), and the Fast-Load cartridge ($39.95) from Epyx (P.O. Box 8020, 600 Galveston Dr., Redwood City, CA 94063). In addition, the July 1985 issue of GAZETTE offered two quick-load programs for the 64, *TurboTape* and *TurboDisk*.

There are two recently released speed-up systems for the 64, both of which require hardware modifications to the 1541 drive, the 64, or both: Professional 1541 DOS and DigiDos.

Professional DOS is a hardware/software combination that causes the 1541 drive to read entire tracks at once rather than just one sector of a track. Distributed in West Germany by Mikrotronic System, the system should have a U.S. distributor by the time you read this. The manufacturer claims that, depending on the file, the system should load between 35 and 50 times faster than a normal 1541 drive. Saving is supposed to be 10 to 20 times faster, and there are reportedly speed improvements in scratch, verify, and fast formatting.

DigiDos ($59.95, plus $3.50 shipping and handling), from DigiTek (10415 N. Florida Ave., Suite 410, Tampa, FL 33612), is an operating system enhancement that speeds up all disk functions. The manufacturer claims that the product will load 39 blocks per second, compared to the normal 2 blocks per second on a normal 1541 drive. The DigiDos system also includes a realtime monitor, a DOS wedge, a variety of new utilities, and single-keystroke commands.

It should be noted that both Professional DOS and DigiDos require hardware modifications that may be beyond the technical abilities of some readers. These changes also would likely invalidate any warranties that apply to your 1541 drive or your 64.

The Real Powerhouses

For those who consider themselves power computer users, the data storage device of choice is usually a hard disk drive. Capable of storing *megabytes* (one megabyte equals 1024K, or approximately one million bytes) of information, hard drives offer both power and flexibility. A ten-megabyte hard drive can hold the equivalent of 60 1541 floppy disks.

A hard disk functions somewhat like a floppy, but operates at much higher speeds. The hard disk itself is usually seated permanently within a case, spinning much faster than a floppy. Rather than having a read/write head that actually touches the disk, as in the 1541 or 1571 drives, a hard drive's recording head floats just above the surface of the disk. Hard drives are much more sensitive to movement and to dust, but improvements over the past several years have left them much less prone to "head crashes" that can destroy data.

There are several manufacturers offering hard drives for the Commodore 64 and 128 computers. And, in general, the prices of these units have dropped considerably in just the past two years.

InConTrol (103 Baughman's Lane, Suite 301, Frederick, MD 21701) offers three versions of its Data Chief hard drive: the HFD-5, a 5-megabyte hard disk selling for $695; the HFD-10, a 10-meg system costing $895; and the HFD-20, a 20-meg hard drive that's available for $995. All three work with either the 64 or the 128, and support all of the DOS commands and wedge commands for both machines. They're *GEOS*-compatible and also contain a built-in floppy drive. The metal housing can hold up to three half-height hard disks, and is expandable.

JCT (P.O. Box 286, Grants Pass, OR 97526) also has three hard disk drives available for the 64 or 128: the JCT-1000, a 3.7-meg system for $595; the JCT-1005, a 5-meg drive for $695; and the JCT-1010, a 10-meg system for $795. JCT is also planning to have a 20-meg system available by midyear. The drives use standard Commodore commands, and include additional subdirectory commands. Data transfer is via the serial bus, and is reportedly 1.7 to 2 times faster than on a 1541. However, parallel transfer is also available with the drives for an additional $50, reportedly speeding up the transfer rate from 10 to 20 times faster than that of a 1541 drive.

Xetec (2804 Arnold Rd., Salina, KS 67401) offers a 20-megabyte drive, the Lt. Kernal, that's available for the 64 for $899 and for the 128 for approximately $950. This drive was originally to be released well over a year ago by Cardco, but because of financial problems at Cardco during that period the system is now being marketed by Xetec. The Lt. Kernal has 42 additional or enhanced system commands, and a reported disk-access speed more than 100 times faster than that of the 1541. There are also built-in backup and restore facilities. Xetec also plans to offer an optional four-computer multiplexer that will allow a maximum of 15 computers to operate together at one time.

Just a year ago, the one or two hard drives available for the 64 had prices in the $1,500 range. Now, with prices half that in some cases, 64 and 128 owners are likely to begin buying these systems in greater numbers.

It would have been difficult to imagine several years ago just how many data-storage options are now available for the 64 and 128. But as new and experienced Commodore owners continue to find out, their computers are among the most versatile and useful machines on the market. ■

WE'RE SELLING THE ONE THING WE COUNT ON EVERY DAY.

Running a software company is no picnic. We have to do major calculations every day. Things like payables and receivables. Taxes. Budgets. And lord only knows how many quarterly cost projections.

That's why we developed geoCalc. The spreadsheet program for GEOS-equipped Commodores.

You see, we not only sell software for Commodores, we actually use them in our own offices. So when Lee needs to project inventory costs, or Brian wants to figure employee bonuses, the first thing they do is load up geoCalc.

The very same spreadsheet you can use at home for figuring finances, mastering math mysteries or personal production predictions.

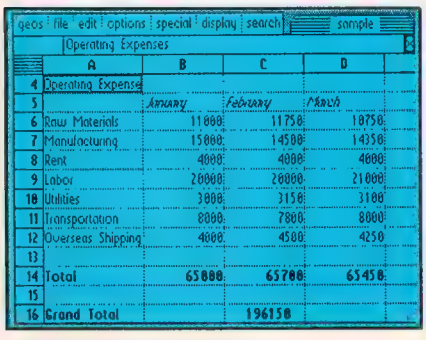
With geoCalc, you get 112 columns and 256 rows to fill with all kinds of text and numbers. And formulas that range from simple addition to arctangents and cosines that could knock any physicist cold.

There are investment functions. Averages. Even a random number generator. And writing your own formulas is as easy as, umm... one, two, three.

With mouse in hand, you can zip all over the huge spreadsheet, solving "what if" questions with a few quick clicks. Questions like, "If Sheila takes the waitress job, how much can we expect our taxes to increase?" Or "How much faster will the Chevy go if we rip out the muffler and the back seat?"

No matter what the problem, if it has to do with numbers, geoCalc can solve it. Fast.

So if you notice a need to decimate digits, consider crunching them with geoCalc. We rely on it for our business. In fact, we couldn't manage without it.



	A	B	C	D
4	Operating Expense			
5		January	February	March
6	Raw Materials	11000	11750	10750
7	Manufacturing	15000	14500	14350
8	Rent	4000	4000	4000
9	Labor	20000	20000	21000
10	Utilities	3000	3150	3100
11	Transportation	8000	7800	8000
12	Overseas Shipping	4000	4500	4250
13				
14	Total	65000	65700	65450
15				
16	Grand Total		196150	

To order call 1-800-443-0100 ext. 234

geoCalc $49.95

(California residents add 6.5% sales tax.)

$2.50 US/$5.50 Foreign for shipping and handling. Allow six weeks for delivery.

Commodore and Commodore C64 are trademarks of Commodore Electronics, Ltd. GEOS, geoCalc and Berkeley Softworks are tradenames of Berkeley Softworks.

GEOCALC

Berkeley Softworks

The brightest minds are working at Berkeley.

THE DIGITAL VOICE

Speech Recognition And Sound Synthesis

Kathy Yakal, Assistant Features Editor

Talking to your Commodore 64 and getting it to talk back may be easier than you think. Over the past five years, a number of companies have marketed speech synthesis and voice recognition systems for the 64. And several of them are still very much involved with these products. Not only is this voice technology a fascinating step forward for computer users, it also has practical applications for people with special needs.

The concept of computers that can talk, listen, and respond has fascinated people for years. Hundreds of science fiction stories and books and dozens of movies and television programs have used the concept in many different ways: the monotones of Robbie the Robot in the classic *Forbidden Planet*, the soothing voice of the deadly HAL computer in *2001*, the *That-does-not-compute* responses of the eccentric robot in TV's "Lost in Space," the verbal barrages between R2D2 and C3PO in *Star Wars*, and even the female computer voice on the U.S.S. Enterprise in "Star Trek."

SID!

But in practical applications, speech synthesis and voice recognition have only recently begun to come into their own. The earliest personal computers that could produce sound were incapable of delivering any noises more sophisticated than the blips, beeps, and whistles that made up many of the first computer games. These computer games were graphics-intensive but sound-poor because of their limited memory and weak sound chips.

The auditory portion of most home computer software then consisted primarily of little snippets of sound effects added for emphasis or of background music repeated over and over again. But during the past two or three years, a variety of new software programs for the 64 have emerged that include sections of speech quite remarkable in its clarity and complexity. For example, many Commodore users may be familiar with the bloodcurdling scream or the taunting "Stay awhile, stay *forever!*" from the Epyx game *Impossible Mission* and with the weird laughter in both the arcade game *Gorf* and Activision's *Ghostbusters* program.

Software designers and peripheral manufacturers realized early on that the Commodore 64 boasts one of the most impressive sound chips designed for any home computer, the SID (Sound Interface Device) chip. Consequently, they began developing tools to maximize the SID chip's contribution to the usefulness and entertainment value of the 64.

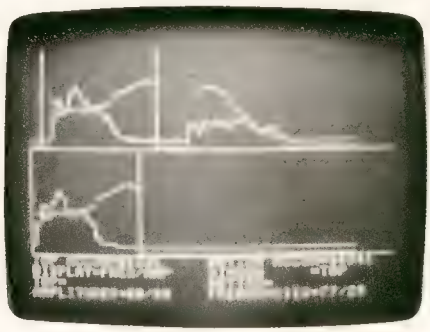
The power of sound has added tremendous emotional impact to many computer games on the Commodore 64. Further, it has made the 64 a more valuable educational tool and has helped meet the specialized needs of handicapped computer owners. Though there are only a handful of companies actively involved in the manufacture of speech synthesizers, digitizers, and voice recognition devices, they continue to upgrade their products to make them both easier to use and compatible with a wider range of software.

Three Different Categories

Let's use three different categories to divide the way the human voice is used in microcomputer programs. Speech can be created for use either in commercial programs or by individuals for their own use through one of two processes: *digitizing* or *synthesizing*. Though digitizing offers more realistic-sounding speech, it also takes up more memory. Digitizing requires external hardware to actually encode the sound digitally, but can be played back in software without any hardware components. Speech synthesis usually requires external hardware and can produce an infinite number of words. (See "Making the 64 Talk," accompanying this article.)

A third area of speech technology is *voice recognition*, which is another form of digitizing. The user talks into a microphone, and the computer seems to understand the command spoken to it, performing some kind of preprogrammed function in response. It doesn't really understand the command. What it's doing is digitizing the words spoken and matching up the digital pattern to previously digitized commands.

The Covox Voice Master (shown here in its new case) is a speech digitizer with many educational, productivity, and entertainment applications.



Speech Construction Set, *when used in conjunction with the Covox Voice Master, is a powerful speech-editing tool.*

An Old Product With New Features

A number of companies have come and gone in the area of voice digitizing products for the 64. The Genesis Computer Corporation produced several products, including the ComVoice Voice System, now marketed through Votrax International. Tronix used to market a product called *SAM (Software Automatic Mouth)*, a disk-based speech synthesizer. Commodore itself released the Magic Voice speech module, a voice synthesizer that added limited speech to the games *Gorf* and *Wizard of Wor*.

Covox, a company that has marketed voice recognition and speech digitizing systems for several years, continues to offer products in this field. What has been the secret to their longevity? "We have a good product at a fair price," says company vice president Brad Stewart. "And we continue to support customers and come out with enhancements. The hardware has everything people need, and the software just keeps getting better."

The Covox Voice Master is a speech-digitization and -recognition module that plugs into a joystick port on the Commodore 64 and sells for under $90. The accompanying software gives it several capabilities. You can speak into the microphone, and the program will digitize and record your voice, saving it for later use. Up to 64 words or phrases can be recorded at once. Once recorded, words can be played back through software alone (without plugging in the module). The program's editor can alter the *amplitude* (breadth or range) of a word or phrase, which means you can actually improve on its original quality. The Voice Master system is also capable of word recognition; you can program it to understand what you say and respond in kind.

Voice Harp, included with the package, is a music composition program. Hum or whistle into the Voice Master's microphone, and musical notes matching the ones you're singing scroll by. Once you've composed a tune, you can go back and edit its harmony, tempo, and pitch, then print out the score.

tcp DOES MAIL ORDER RIGHT

Peter Tussey President TUSSEY COMPUTER PRODUCTS

GREAT PRICES

"We buy in volume and pass the savings onto you!!!"

FAST SERVICE

"Over 90% of all items ordered are in stock and shipped within 24 hours."

FEDERAL EXPRESS

FEDERAL EXPRESS

"Software orders over $50.00 will be shipped Federal Express. You only pay TCP's standard shipping charge of $4.00 per order. This offer also valid on peripherals and accessories under 8 pounds. Orders arriving before 11:00 am our time will be shipped out same day."

BEST SELECTION

"We stock hundreds and hundreds of products for commodore computers! Every week we add even more. We're the first to get in all the hot new software releases. Just another reason why we should be your first call!!"

"I'm proud we deliver all of these. Response from tens of thousands of satisfied customers can only mean we're doing mail order right!"

EDUCATIONAL & CORPORATE ACCOUNTS:

We offer a full line of services catering to you. Including; quick turn-around, personal service, and the flexibility to serve your organizations needs. Credit Approval in 24 hrs for any organization with a good D&B rating.

To reach our Educational and Corporate Sales Department directly, Call 1-800-533-1131 or Inside PA Call 814-234-2236

OTHER CUSTOMERS PLEASE CALL THE NUMBER LISTED BELOW

FREE INFOCOM ADVENTURE GAMES $40.00 value

With any purchase over $50.00

As a thank you to our many valued customers we are giving away one of these Infocom Adventure Games (your choice), with every order over $50. This offer is good on any of the items on the next 2 pages, when ordered before June 30, 1987. If you've never ordered from TCP before, this is a great opportunity to get acquainted.

tcp **TUSSEY COMPUTER PRODUCTS**

P.O. BOX 1006
STATE COLLEGE, PA 16804

CALL TOLL FREE **1-800-468-9044**

Inside PA
Call 814-234-2236

tcp DOES MAIL ORDER RIGHT

OPEN: 9am-8pm Mon-Fri, 10am-5pm Sat EAST COAST TIME
NEW HRS STARTING MAR 01: 9am-9pm M-Thur, 9am-6pm Fri, 10am-6pm Sat, Noon-6pm Sun

INFORMATION AND PA ORDERS 814-234-2236

GAME GALLERY

Educational Software too!
All Games stocked for quick ship!!!

NEW TITLES

IN STOCK EVERYDAY!!
If you don't see what you want please call!!

MISC GAMES
Championship Boxing $17.95
Hobbitt ..... $CALL
International Hockey $18.95
Murder by the Dozen $24.95
Pole Position $15 95
Sargon III $37 95
Sky Travel $27 95

ACCESS
Beach Head, Beach Head 2, Raid
Triple Pack $29 95
Leader Board $29 95
Leader Board Tourn. Disk $16 95
Tenth Frame $27.95

ACCOLADE
Ace of Aces ..... $CALL
Dam Busters $22.95
Fight Night $22.95
Hard Ball $22 95
Killed Until Dead ..... $CALL
Law of the West $22.95
PSI 5 trading co $22 95
Spy vs Spy $12.49

ACTIONSOFT
Call for price on all Actionsoft titles

ACTIVISION
Alcazar $19.95
Borrowed Time $19.95
Comp. Firewks Celebrat'n $19.95
Countdown to shutdown ... $19 95
Fast Tracks Slot Car Const $19 95
Gamemaker Scifi Library... $15.95
Gamemaker Sports Library $15.95
Garry Kitchen's Gamemakr $24 95
GBA Basketball 2 on 2 ..... $24 95
Ghostbusters $24.95
Great Amer RR $24.95
Hacker $19.95
Hacker II $24 95
I am the 64 ..... $21.95
I am the 128 ..... $24.95
Little Computer People $24 95
Master Of Lamps $19.95
Mindshadow $19.95
On Court Tennis $21.95
Pitfall II: Lost Caverns $19.95
Shanghai $26.95
Space Shuttle $19 95
Star Rank Boxing $21.95

AVALON HILL
Dr Ruth $21.95
Gulfstrike $22.95
Spitfire 40 ..... $24.95
Superbowl Sunday $26 95
Team Disk for SS $16.95

BRODERBUND
Champshp Lode Runner .. $24 95
Karateka $19.95
Lode Runner $24.95
Music Shop $29.95

DAVIDSON & ASSOC.
Now in stock! Call for price on titles

DATA EAST
Commando $24.95
Karate Champ $26 95
Kung Fu master $26.95
Pole Position $15 95

ELECTRONIC ARTS
Adventure Constr $27 95
Age of Adventure $12 95
America's Cup $24.95
Amnesia $29.95
Archon $12 95
Archon 2 ..... $12 95
Artic Fox $24 95
Autoduel $37.95
Bard's Tale $32.95
Bard's Tale II $29 95
Bard's Tale Clue Book $10.95
Battlefront $29.95
Carriers at War $37.95
Chessmaster 2000 ..... $26 95
Cut and Paste $12 95
Dan Dare $16 95
Europe Ablaze $37.95
Golden Oldies $21.95
Hard Hat Mack $13.95
Heart of Afnca $12 95
LordS of Conquest $24 95
Mail Order Monsters $12 95
Marble Madness $23 95
Moebius $29.95
Movie Maker $12.95
M.U.L.E. $12 95
Murder Party $25.95
Music Construction Set $12 95
Ogre $29.95
One on One $12 95
PHM Pegasus $27.95
Pinball Construction Set ... $12.95
Quizam $20 95
Racing Destruction Set $12.95
Reach for the Stars $32.95
Realm of Impossible $12.95
Road to Moscow $29 95
Robot Rascals $29 95
Russia $29.95
Seven Cities of Gold $12.95
Sky Fox $12 95
Software Golden Oldies ... $16.95
Starfleet I $32.95
Super Bolder Dash $12.95
Mind Mirror $12 95
Touchdown Football $22.95
Ultima I $29 95
Ultima III $37.95
Ultima IV $45 95
Ultimate Wizard $12.95
World Tour Golf $27 95

EPYX
500 XJ Joystick $14.95
Championship Wrestling .. $27 95
Deystroyer $29.95
Movie Monster $22.95
Street Sports ..... $CALL
Sub Battle ..... $CALL
Summer Games $26 95
Summer Games II $26.95
Super Cycle $29.95
Temple Trilogy $29 95
Winter Games $27.95
World Games $29.95
World's Greatest Baseball $24 95
World's Greatest Football $28 95
World Karate Cha $22.95

FIREBIRD
Elite $22.95
Pawn $27.95

INFOCOM
Balley Hoo $29 95
Cut Throats $22 95
Deadline $25.95
Enchanter $25.95
Hitchhiker's Guide $22 95
Hollywood Hyjinx ..... $CALL
Infidel $29.95
Leather Goddesses $24 95
Moon Mist $24.95
Planetfall $25.95
Sorcerer $29.95
Spellbreaker $29.95
Suspect $29.95
Tnnity $32.95
Wishbringer $25.95
Witness $25.95
Zork I $22 95
Zork II $26 95
Zork III $26 95

INVISICLUE BOOKS FOR ANY INFOCOM GAME $6.95

LANCE HAFNER
3 in 1 Football $29 95
Basketball, the Pro Game.. $29.95
Final Four Basketball $29 95

MICROLEAGUE
Microleague Baseball $27 95
Microleague general mgr $27 95
Microleague 1985 teams $15.95

MICROPROSE
Acrojet $24.95
Crusade in Europe $27.95
Decision in the Desert $27 95
F-15 Strike Eagle $21.95
Gunship ..... $CALL
Conflict in Vietnam ..... $CALL
Hellcat Ace $21 95
Kennedy Approach $24.95
NATO Commander $24.95
Silent Service $24 95
Solo Flight $24 95
Spitfire Ace $21.95
Top Gunner..... $CALL

MINDSCAPE
Bank Street Music Writer . $27 95
Bank Street Storybook $27 95
Bop-n-Wrestle $21.95
Castle Clobber $18.95
Fist $19.95
Halley Project $27 95
Indiana Jones $22.95
Indoor Sports $22 95
Infiltrator $21.95
Parallax ..... $CALL
Perfect Score:SAT prep .. $49.95
Quake minus one $17.95
Shadowfire $17.95
Star Trek Promethian Adv $29 95
The Lords of Midnight $17.95
Uchi Mata ..... $CALL
Undium ..... $CALL

Call for prices on other MINDSCAPE products!

RADARSOFT
Floyd the Droid $19.95
Maps USA $34.95
Maps Europe $34.95
World Maps $34 95
Championship Boxing $17.95

SIMON & SHUSTER
Paper Airplane const. ..... $CALL
JK Lasser's Income Tax $39.95
Kermit's Story Maker $19 95
NY Times Crossword Puzzle
Vol. 1 or 2 ..... $14 95
Spy Hunter $19.95
Star Trek-Kobayashi alt. ... $29.95
Typing Tutor III $29.95

SPECTRUM HOLOBYTE
Gato ..... $CALL

SPRINGBOARD
Early Games $26 95
Easy As $29 95
Piece of Cake Math $26.95

SUBLOGIC
Flight Simulator II $32.95
Football $37.95
FS II Scenery disk $15.95
Jet $29 95
Night Mission Pinball ..... $CALL
Pure Stat Baseball $37.95

WEEKLY READER STICKY BEAR SOFTWARE
now in stock! Call for price on titles!

Random House, Spinnaker, and SSI products in stock!!!
Call for Price!

C-64 BUSINESS AND PRODUCTIVITY

C-64 DATABASES
Bank Street Filer $34 95
Consultant $39.95
Data Manager $19.95
Fleet Filer $29.95
Profile 64 ..... $36.95

C-64 INTEGRATED PKGS
Homepak $39 95
Trio ..... $CALL
Vizastar 8k $79.95
Vizastar 64 4K $39 95
Vizastar 64 8K $59.95

C-64 SPREADSHEETS
Calkit $39 95
Swiftcalc 64 w/sideways ... $39.95
Sidways $19 95

C-64 WORD PROCESSORS
Bank Street Wnter ..... $CALL
Bank Street Speller $34 95
Cut & Paste(EOA) $12.95
Fleet System II ..... $CALL
Font Master II $34.95
Kid Pro Quo $32.95
Paperclip $37 95
Paperclip w/spellpack $49 95
Pocket Wnter Dictionary ... $19.95
Speilpro 64 ..... $32 95
Trio ..... $CALL
Wordpro 3+/64 ..... $14 95
Wordpro 64 ..... $36 95
Wordpro GTS ..... $CALL
Word Writer 64 w/speller .. $34.95

FINANCIAL & ACCT.
Financial Cookbook $12 95
Financial Time Machine $29.95
Softsync Pers. Acct. $32.95
Timeworks Electr. Checkbk $19 95
Timeworks Money Mgr $19 95

GRAPHICS
Clip Art I $19.95
Clip Art II ..... $CALL
Graphics Scrapbk 1 or 2... $17.95
Newsroom $34.95
Picasso's Revenge w/pen $42.95

MISC. HARDWARE
Estes pwr supply for C-64 $54.95
Naverone 3 Slot expander $27.95

UTILITIES
GT4 ..... $22.95
Copy II 64/128 ..... $24 00
C Power $69 95
CSM 1541 align $34.95
Fast Load $24 95
Mach 5 ..... $24.95
Merlin 64 ..... $34.95
Pal 64 ..... $32.95
Vorpal fast loader ..... $CALL

PRINTERS

star micronics inc

NX-10
PRICE DROP TO
$199

NP-10	$174.95
NX-10C	$CALL
NX-15	$349.00
NL-10C	$CALL
POWERTYPE	$229.00

18cps, daisywheel

BROTHER 1509
$379.00
180 cps, 15" carriage, NLQ Mode

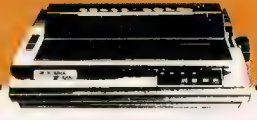
Epson Printers 1 yr warranty

LX-86	$229.00
FX-86e	$359.00
FX-286e	$CALL
HS-80 INKJET	$CALL

XETEC

Fontmaster 128...	$CALL
Fontmaster 64	$34.95

SEIKOSHA
2 YR WARRANTY
SP-1000 VC $164.95
SP-1200 AI ..... $CALL
120 cps, NLQ Mode



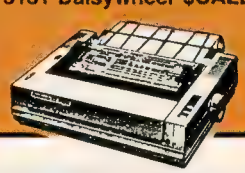
JUKI

5510P includes color kit	$CALL

Printer Interfaces

MW-350 w/10k buffer	$CALL
XETEC Supergraphix	$CALL
XETEC Supergraphix Jr	$46.95

PANASONIC
2 YR WARRANTY
1080i $199.95
1091i, 1092i ..... $CALL
3131 Daisywheel $CALL



tcp TUSSEY COMPUTER PRODUCTS
P.O. BOX 1006
STATE COLLEGE, PA 16804

tcp DOES MAIL ORDER RIGHT

CALL TOLL FREE 1-800-468-9044

MONITORS

CALL FOR THIS MONTHS SPECIALS ON COLOR AND MONO-CHROME MONITORS!!

MODEMS

SHAREDATA	$36.95
VOLKS 6480 300/1200 baud	$CALL
1660	$CALL
COMPUSERVE ST'R KIT	$19.95
PLAYNET STARTER KIT	$14.95

CMS

General Acct System

includes: • General Ledger • Accts Receivable • Billing Statements • Accts Payable • Check Writing • Job Costing • Payroll

Pkg. Price for all Modules:

C128 version	$124.95
C64 version	$119.95

TCP leads the way!!!

128 AND 64 HARD DRIVES FROM JCT

Plugs into the disk drive port just like the 1571 to maximize compatibility. 5 year warranty on the mechanical portion of the Hard Drive. 1 Year warranty on electronics. Immediate replacement within 1 year.

MODELS AVAILABLE:

JCT 1005, 5mb ..... $CALL
JCT 1010, 10mb ..... $CALL

PRINTER PACKAGES

ALL PRINTERS INTERFACE WITH C-64 or C128

Star

NP-10 & XETEC Supergraphix Jr $217.95
NX-10 & XETEC Supergraphix $269.95
NX-10 & XETEC Supergraphix Jr $249.95

PANASONIC

1080I and Xetec Supergraphix $259.95
1080I and Xetec Supergraphix jr . $244.95

SEIKOSHA

Call for price on new SP-1200 packages

OKIDATA

Okimate 10 Color Printer and Plug 'n' Print Module $159.95

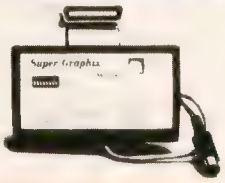
EPSON $CALL FOR LX-86 & INTERFACE.. LOWEST PRICE

BROTHER

1509 & XETEC SUPERGRAPHIX..... $419.00

Xetec

SUPER GRAPHIX
Interface w/8k buffer
down loadable fonts
$$$LOWEST PRICE
SUPER GRAPHIX JR
printer interface $46.95



Abacus

NOW IN STOCK!! Call for price on all books and software titles

Broderbund

Broderbund Print Shop	$25.95
Print Shop Companion	$22.95
Graphics Library I, II, or III	$16.95
120 sheet color paper refill 40 each red, blue, gold	$8.95
Certificate Maker	$32.95
Thinking Cap	$32.95
Certificate Library	$24.95
Toy Shop	$42.95
Holiday Pack	$16.95

DISKS

per box of 10

BONUS DISKS	
SS/DD	$6.45
DS/DD	$6.95
NASHUA DISKS	
SS/DD	$8.95
DS/DD	$9.45
TUSSEY DISKS	
SS/DD	$8.45
DS/DD	$8.95

Call for Price on Verbatim and Maxell Disks!!

Digital Solutions Inc.

Pocket Writer 2	$42.95
Pocket Filer 2	$42.95
Pocket Planner 2	$42.95
Digital Superpak	$74.95
Dictionary	$12.95

Unison World

Printmaster	$29.95
Art Gallery	$CALL

SOLUTION UNLIMITED

Icon Factory	$29.95
Billboard Maker	$29.95

MODEM MANIA

1670 MODEM $99.95
1200 Baud, w/Software
1660 MODEM $42.95
300 Baud, w/Software

Software orders over $50.00 will be shipped FEDERAL EXPRESS (yes, even with *these* prices)

You only pay TCP's standard shipping charge of $4.00 per order This offer also valid on peripherals and accessories under 8 pounds Orders arriving before 11:00 AM our time will be shipped out same day.*

FEDERAL EXPRESS

Computerized order entry, processing and status allow TCP to serve you faster and better!

COMMODORE 128= SOFTWARE

WORD PROCESSOR

FLEET SYSTEM II w/spell	$47.95
FLEET SYSTEM III w/spell & thesaurus	$CALL
FLEET SYSTEM 4	$56.95
Font Master 128	$44.95
Ghost Writer 128	$29.95
JANE	$32.95
PAPERCLIP II	$CALL
PERFECT WRITER	$CALL
SUPERSCRIPT 128	$59.95
TERM PAPER WRITER	$34.95
VIZAWRITE 128	$CALL
WORDPRO 128	$59.95
WORDWRITER 128 w/spell	$49.95

SPREADSHEETS

EPYX MULTIPLAN	$39.95
PERFECT CALC	$CALL
SWIFTCALC 128 w/sdways	$49.95

DATA BASES

CONSULTANT	$39.95
DATE MANAGER 128	$CALL
FLEET FILER	$29.95
PERFECT FILER	$CALL
PROFILE 128	$59.95
SUPERBASE 128	$CALL

MISC. 128 SOFTWARE

A Mind Forever Voyaging	$26 95
ACCOUNTANT INC	$69.95
BUDDY 128 assembler	$42.95
C POWER from Proline	$59.95
DESK MANAGER 128	$34.95
I am the C128	$24.95
VIZASTAR 128	$CALL
MACH 128	$39.95
MATRIX from Prog.Periph	$47.95
PARTNER 128	$54.95
PERSONAL ACCT.128	$34.95
SYLVIA PORTER'S personal finance planner	$54.95
Copy II 64/128	$24.00

ALL COMMODORE PRODUCTS ON SALE NOW!!

AMIGA PACKAGES	$CALL
AMIGA EXTERNAL FLOPPY	$CALL
1670 MODEM	$99.95
1350 MOUSE	$39.95
C128 COMPUTER	$249.00
1571 DISK DRIVE	$CALL
1902A	$LOWEST PRICE EVER
1750 RAM EXPANSION	$CALL
1802C	$199.00
1700 RAM EXPANSION	$99.00

COMMODORE 64C

ONLY $169.95

Includes GEOS & Quantum Link
1541C DISK DRIVE..... $CALL
1802C MONITOR..... $CALL

Berkeley Softworks

GEOS	$39.95	Deskpack	$22.95
Geo Calc	$CALL	Fontpack	$CALL
Geo File	$CALL	Writers Workshop	$33.95
Geodex	$27.95		

To order by mail: We accept money order, certified check, personal check. Allow 2 weeks for personal check to clear.
Shipping: $4.00 for software and accessories/ $10.00 for printers and color monitors/ $8.00 for disk drives and other monitors/ Add $3.00 per box shipped COD. Call for other shipping charges. Additional shipping required on APO, FPO, AK, HI, and foreign orders.
Terms: ALL PRICES REFLECT CASH DISCOUNT, ADD 1.9% FOR MASTERCARD OR VISA. All products include factory warranty. **ALL SALES ARE FINAL.** Defective items replaced or repaired at our discretion. Pennsylvania residents add 6% sales tax. Prices and terms subject to change without notice.

- If through some oversight we don't have the lowest price, we would appreciate the opportunity to beat it. If we can, you will get the benefit of our Federal Express shipping on software orders over $50.00.
- Purchase orders are accepted from qualified corporations and institutions.
- No sales tax on orders outside of PA.
- We accept Mastercard, Visa, COD and mail orders.

MasterCard VISA

CALL TOLL FREE 1-800-468-9044

tcp

Altering Your Prosody

Votrax, another company producing voice technology products for the 64, developed its early reputation primarily through high-end speech synthesizers manufactured for the professional market.

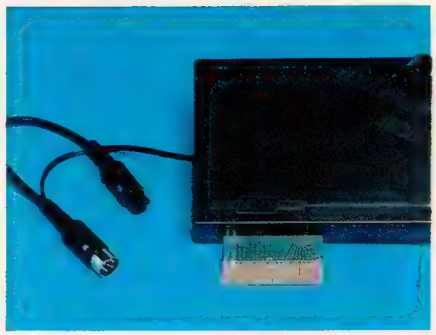
A couple of years ago, Votrax introduced its first consumer product, the Votalker cartridge for the Commodore 64. Selling for $99.95, the Votalker speech synthesizer fits into the expansion port and uses 8K of the computer's memory. Since it's a voice synthesizer, you must type in the words you want it to say, sometimes altering the spelling to avoid a mispronunciation. You can choose from among nine volume settings and four pitches; you can also vary the speed. This ability to vary so many parameters makes it possible to alter the voice *prosody*, the personality of one's speech. (For a review of the Votalker, see the June 1986 issue of GAZETTE.)

At about the same time that the Votalker was introduced, a British company, Welwyn Currah, released a speech synthesizer for the Commodore 64 called the Voice Messenger. Realizing that there was a great deal of interest in programs that already incorporated speech, Currah teamed with another company, Research in Speech Technology, which developed software compatible with the voice system. For the last year, those products have been marketed under the name Hearsay, Inc., and the product line continues to expand.

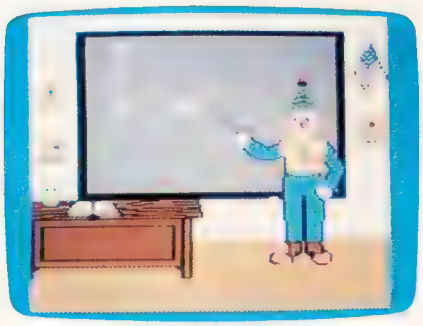
Now called the Hearsay 1000, the voice hardware is a combination speech synthesis/voice recognition peripheral. The module plugs into the Commodore 64's expansion slot and comes packaged with software that allows user-programmed speech. Suggested retail price is $79.95.

Steve Veltri, president of Hearsay, feels that voice synthesis and recognition is relatively new to the consumer marketplace in terms of real-life applications. Education, he believes, is one of the first and most important applications. After all, before a child can use the keyboard, he or she can talk and listen.

For this reason, Hearsay has developed a line of educational software to be used in tandem with the voice synthesizer. The first three titles in this Software for Children line are *Aqua's Circus*, *Rhyme and Reason*, and *Think Bank* ($29.95 each). Using colorful graphics and familiar characters, these programs help children learn verbal skills, coginitive development, vocabulary, and mathematical skills.



The Hearsay 1000 combines speech synthesis and voice recognition in one unit. The Commodore version comes with SwiftLoad *(for fast loading), and retails for $79.95.*



Aqua's Circus *is one of the first titles in Hearsay's line of educational software developed to support the Hearsay 1000. Each program in the series retails for $29.95.*

Beyond that, says Veltri, these voice-driven programs give children an early sense of accomplishment, one that normally isn't achieved until a child can actually read and write.

The Hearsay 1000 also works with many third-party programs from major software publishers like Infocom, Epyx, CBS Interactive Learning, and Batteries Included. In fact, any text-based programs should be compatible, allowing you to issue verbal commands instead of keyboard entry. For example, if you were playing the all-text adventure *Zork*, the Hearsay 1000 would read a line to you, and you would speak the command back rather than typing it in. Since no speaker is necessary on the Commodore 64 unit, you can just sit in your chair and issue commands.

Helping The Handicapped

A third use for voice recognition and synthesis is providing alternatives for handicapped individuals, says Veltri. Keyboard entry—including cursor control—can be done verbally instead of manually, making computer use feasible for visually and physically disabled persons.

For people with hearing disorders who want visual feedback about their voice pitch (where and when it goes up and down), Covox's new *Speech Construction Set* may be of help. This program does for voice what drawing and painting programs do for creating pictures. Using the software's split screens and high-resolution graphics, you can manipulate and track speech patterns in a variety of ways. The suggested retail price is $39.95.

For more information about how microcomputer technology is being used to help the handicapped, contact Closing the Gap, P.O. Box 68, Henderson, MN 56044. This group offers a monthly newsletter, and the publishers also sponsor an annual conference.

Hey, You!

If you've walked through a computer game arcade recently, you've probably heard all kinds of machines challenging you to step up and play. Like pitchmen at a carnival, today's computer games often try to lure you into playing by verbally taunting and teasing you. Graphics and action may keep you interested in a game, but sound—especially the latest electronic verbal gymnastics—rope you in.

The current developments in the field of voice technology are indicative of what's happening in the microcomputer industry at large. Voice creation technology is constantly being refined as consumer need and acceptance are gauged, then incorporated into every level of consumer electronics technology. Applications extend from the home to the workplace, including our biggest industries. Talking

F L I G H T !

From the sophisticated realism, detail, and intellectual stimulation of Flight Simulator...

...to the brute-force fun, thrills and excitement of Jet...

...with new adventures in Scenery Disks...

...SubLOGIC. The State of the Art in Flight.

See Your Dealer. For additional product ordering information or the name of the dealer nearest you, call (800) 637- 4983.

subLOGIC Corporation
713 Edgebrook Drive
Champaign IL 61820
(217) 359-8482 Telex: 206995
ORDER LINE: (800) 637-4983
(except in Illinois, Alaska and Hawaii)
Open 7 AM to 9 PM Central Time

Making The 64 Talk

Todd Heimarck, Assistant Editor

There are two ways to make a computer speak: digitizing and synthesizing. Each approach has advantages and disadvantages.

A speech digitizer is like a tape recorder. It has a microphone and electronic circuits that transform the continuous (analog) sounds into discrete (digital) numbers. If you speak a word or phrase into the microphone, the digitizer converts your voice into a series of numbers that represent the frequencies and volume of your words.

The numbers are then stored in memory or saved to disk. To replay the digitized sounds, you use a driver program that reads through the numbers and feeds the appropriate values to the sound chip in your computer.

Speech synthesizers, on the other hand, string together a series of *phonemes* to form words. A phoneme is the smallest meaningful sound in a language. In English, for example, *bat* and *pat* are considered separate words, because the sounds represented by *b* and *p* are separate phonemes. There's a loose connection between spelling and sounds, but two letters such as *th* are pronounced as a single phoneme, and the single letter *x* is two phonemes (a *k* sound and an *s*). Speech synthesizers don't use a microphone. Instead, you usually type in the words to be spoken, and the program *concatenates*, or links together, the individual sounds. Some speech synthesizers require phonetic spellings; others understand some of the quirks of English (*tough* and *though* are spelled similarly but pronounced in different ways, for example).

Stay Awhile, Stay Forever

When you hear a very realistic voice in a commercial game, what you're hearing has almost certainly been digitized by a service that specializes in creating sounds for software companies. They use sophisticated computer systems to record and dissect the phrases for a game. For Epyx's game *Impossible Mission*, someone sat down with a microphone and spoke the words *Stay awhile, stay forever*. The words were then analyzed down to a series of individual sounds that could be played back through the 64's SID chip.

The most attractive feature of digitizing is the high-quality speech. It sounds as if someone is really talking (or laughing or screaming) because it's essentially a recording of a real person's voice.

A second advantage is that once a sound has been digitized, it can be played back without external hardware (although you do need a 64 with a working SID chip). The voice can be generated entirely through software. If you're writing games to be sold or distributed, this means you can add digitized voices or sound effects to your product without requiring your customers to purchase any additional hardware. Of course, you need hardware to digitize the original sounds, microwave ovens, dishwashers, cars, and telephones are bringing science fiction closer to science fact.

Home control is one area where voice technology will almost certainly be accepted, and many companies are developing products toward that end. Covox will introduce James, The Electronic Butler, a marriage of its own Voice Master module and the X-10 Home Control System which allows simple voice-activated control of home appliances.

Covox is also working in another area that is meeting with some acceptance: low-cost talking software. "The Commodore 64 is still the best machine going for that kind of program," says Covox's Stewart. Using colorful graphics within an interactive format, these Covox educational tools are expected to be available by summer of 1987.

Talking Teacher is the first educational product released by Firebird Licensees, a U.S. distributor for a line of British software that has met with strong approval in its first 18 months here. It also employs a graphics-intensive interactive environment enhanced by speech digitizing.

The speech for *Talking Teacher* was created for Firebird by Electronic Speech Systems, a company that's done a great deal of speech production work for many companies in the toy, automotive, and military fields. ESS has also been known for several years in the microcomputer game world. For example, it was ESS that put the digitized speech in *Impossible Mission* and the eerie laughter in *Ghostbusters*, among other game titles.

Just as you can create speech for your own computer programs using inexpensive tools at home, commercial software publishers have the resources to do the same. But the trend in software development these days is to give over specialized elements of program design to experts, like bringing in professional artists to draw graphics, musicians to compose music, and authorities in many fields to lend expertise on program content. ESS uses its own computers, recording studio, and audio engineers, resulting in better compressed, more finely-tuned speech for programs.

Contemporary Programming & Software Design Series

Available for IBM PC/IBM PC Compatibles and Commodore 64/128™ microcomputers.

Check your preference below:

☐ IBM ☐ Commodore 64/128

Ten modules teach you how to write your own programs or modify existing software to fit your needs:

- Getting Started in Programming & Software Design
- Attacking the Problem
- How to Design the Solution and Arrange It Logically
- Coding the Program: High Level Languages
- Coding the Program: Assembly Language
- Testing and Debugging Made Easy
- Creating Meaningful Documentation
- Modifying & Updating Existing Programs
- Tools & Tricks for Program Design
- Writing Advanced Programs

15 Day Trial Examination Order Form

YES! I would like to learn how to make any computer do exactly what I want it to do and would like to examine the first module in the Series absolutely free. If I decide to keep it, I will pay just $24.95 plus $2.25 shipping and handling. I will then receive future modules automatically, one every 4 to 6 weeks. Each of the 10 modules in the Series is $24.95 plus $2.25 shipping and handling and comes on the same 15-day Trial Examination basis. There is no minimum number of modules that I must buy and I may cancel at any time simply by notifying you.

If I do not choose to keep the first module, I will return all materials in good condition and pay nothing. Future modules will be canceled and I will be under no further obligation.

Name _____
(Please Print)

Street _____

City/State/ZIP _____

Phone Number ( ) _____

All orders subject to approval and payable in U.S. funds only. Available in U.S. and Canada only. Add stamp and mail today.

2512-057

D

Post Office
Will Not
Deliver Without
First Class
Stamp

McGraw-Hill Continuing Education Center
3939 Wisconsin Avenue
Washington, D.C. 20016-9265

Make Any Computer Do Exactly What You Want With McGraw-Hill's

Contemporary Programming & Software Design Series

Make no mistake. Almost all books and courses on "programming" teach you only the final 5% of the total programming process—namely, how to code in a specific language . . . information of little value if you don't know how to reach the point in the programming process when you are ready to code.

With the Series, however, you'll learn to create your own programs from scratch, even modify off-the-shelf programs. You'll learn enough BASIC and machine language to get you started on the remaining 5% of the programming process.

From Writing Your Own Programs to Modifying Existing Software, Here's the New, Easy, and Low Cost Way to Unlock the Secrets of Your Computer

Whether you use computers for business, for personal applications, or for fun, off-the-shelf programs will never do everything you want them to do for you. That's because they were written by programmers to satisfy what they perceived as the needs of the greatest number of potential users—often missing some or many of your specific needs.

That's why McGraw-Hill's new Contemporary Programming and Software Design Series teaches you how to create your own software . . . either from scratch or by making key modifications to existing programs.

There is nothing magical about it. You learn the process of building a computer program step-by-step with McGraw-Hill *Concept Modules* sent to you one at a time, once a month. Each of the ten modules in the Series takes you through an important step in the development of the structure and detailed logic of a program, including testing, debugging, and documentation.

Unique Interactive Hands-On Instruction

Each module includes an easy-to-understand guide PLUS a 5¼" floppy disk containing typical programs and interactive instruction that you can run on Commodore 64 and 128 computers, IBM PCs and PC compatibles for hands-on experience.

In the first Module, for example, when your sample program (Declining Interest Loans) appears on your screen, you'll find errors on certain program lines. You'll also see that the program is only three-quarters completed.

Now comes the fun part. You'll discover how this program is built, and in the process you'll learn how to identify and correct errors. And by the end of Module 1, you'll actually have completed this program yourself.

But there's more. Special graphics on your screen work in conjunction with the accompanying guide to amplify, illustrate, and deepen your understanding of software design principles.

Build Your Own Personal Software Library

The sample programs you work with throughout the Series are excellent learning tools. But they're more than that. By combining the sample programs onto one master disk, you'll have the start of your own personal software library. In addition to the programs you've written and modified throughout the Series, you'll also receive dozens of the most popular public domain and user-supported programs, such as data base manager, word processor, calendar generator, appointments reminder and much, much more.

15-Day No-Risk Trial

To order your first module without risk, send the postage-paid card today. Examine the first module for 15 days and see how the Series will help you make your computer do exactly what you want it to do!

If someone has beaten you to the card, write to us for ordering information about the Contemporary Programming and Software Design Series.

The Crucial 95%—Learn the Foundation of Computer Programming

While the Series includes interactive disks that run on specific computers, everything you learn you can apply to any language or machine. Why is this possible? Because McGraw-Hill knows programming is far more than coding a program into the computer using a specific language. In the real world of computers, 95% of the programming process is carried out using design techniques that are independent of specific language or machine. It is this crucial 95% that you thoroughly understand and master in the Series.

McGraw-Hill Continuing Education Center
3939 Wisconsin Avenue
Washington, DC 20016

but after they have been turned into numbers, the digitizing hardware is no longer needed.

A serious drawback of digitized speech is that you can play back only the sounds you recorded. Digitizing is like taping a song from the radio. You can't, for example, record a rock song and turn it into a bluegrass melody. The Commodore Magic Voice Module—which has been discontinued—used digitized speech. It had roughly 200 words in ROM—that was it. If you wanted to hear one of the built-in words, it would pronounce it. If you wanted to hear anything else, you were out of luck. It only knew the words that were digitized.

A second problem with digitizing is that it eats up memory. If you've been in a record store lately, you've probably seen one of the new compact discs (CDs). All of the music on the discs is recorded digitally, and each CD holds 550 megabytes, more than half a gigabyte. To put it another way, the amount of information that fits on one CD would require roughly 4000 disks formatted on a 1541. The memory of a 64 would hold less than a second's worth of music from a compact disc.

The music on a CD is originally sampled 44,000 times per second. Speech digitizers have a sampling rate that's much slower (which is one way to save memory). But as the sampling rate gets lower, the quality begins to suffer. At a minimal acceptable level, you might be able to fit ten seconds or so into the available memory of the 64. Unless you have large amounts of memory, digitized speech is a compromise between quality and quantity.

Speech Synthesizers

There are two examples of synthesized speech you may be familiar with. One is in the movie *War Games*, which included a brief role for a speech synthesizer which said "Shall. We. Play. A. Game?" The other you may have heard if you've visited a computer store recently, or know someone who owns an Amiga, which has a software speech synthesizer.

Here's how speech synthesizers are constructed: If you recorded 100 people pronouncing a variety of words containing the *v* sound, then analyzed the characteristics of *v* with an oscilloscope, you could separate the individual components of the average *v* sound and thus reproduce the *v* sound with oscillators or a computer's sound chip. Repeat this process for all the sounds of the language and you'll end up with a speech synthesizer. Each sound is put together (synthesized) as it is output. The phonemes act as building blocks that can be combined to make words and sentences.

Most synthesizers for the 64, including the ones made by Votrax and Currah, are sold as hardware cartridges that plug into the back of the 64. They may have a separate speaker on the cartridge or may include a cord that diverts the sound through the speaker of your TV or monitor. There once was a speech synthesizer for the 64 that worked in software (*Software Automatic Mouth*, or *SAM*), but it's no longer available.

The most attractive feature of speech synthesis is that it gives you an infinite number of words. With a limited number of phonemes—usually 64—you can build any word in the English language. Digitizers can play back only what they've recorded, but synthesizers can say anything.

Speech synthesizers have a second advantage: They don't require a lot of memory. For a digitizer to record someone saying the word *phone* might require thousands of bytes. But all a speech synthesizer needs to know is that it should pronounce the *f* sound, the *oh* sound, and an *n*. Three sounds—three bytes of memory.

As you might have guessed, speech synthesizers have some shortcomings. For example, the quality of synthesized speech is not as good as that of digitized speech. Synthesizers often sound unexpressive and "computery" (think of the voice from *War Games*). Some synthesized speech has a sort of Scandinavian accent.

And finally, if the synthesizer is in hardware, you can add speech to your own programs, but other people can't use your program unless they also own a speech synthesizer.

A Combination Of Input Devices

Voice recognition is probably the most familiar existing method of getting information into a computer. We're all used to talking to other people, having them hear and process what we say, then having them respond.

But voice recognition may not be the most appropriate method in all settings. Using a Covox product in conjunction with a word processor like *SpeedScript*, it's possible to avoid entering all of the formatting commands, saving time and keystrokes. That's fine when you're sitting in your own private office or workroom at home. But imagine the chaos that it would create in an open office—five or six different people each trying to have their commands heard over the commands being issued by the others.

Covox's Brad Stewart believes that we're heading toward a combination of input devices, each of which—whether mouse, joystick, keyboard, or light pen—is used where most appropriate. And voice technology still has a long way to go. "Technology for speech recognition is not at a point where you can rattle off a sentence and have the computer figure it out," he says.

But voice technology has come a long way. "After all," says Stewart, "Who would have imagined that today we'd have *GEOS* or voice recognition or sophisticated speech synthesis on the Commodore 64?"

For more information on any of the products mentioned here, contact:

Covox
675-D Conger St.
Eugene, OR 97402

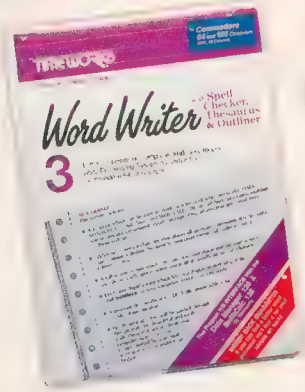
Electronic Speech Systems
3216 Scott Blvd.
Santa Clara, CA 95054
(For a telephone demonstration of the speech quality of ESS products, call 415-644-8127.)

Firebird Licensees
P.O. Box 49
Ramsey, NJ 07446

Hearsay
1825 74th St.
Brooklyn, NY 11204

Votrax International
1394 Rankin
Troy, MI 48083

THE LEADING C64 WORD PROCESSOR JUST GOT BETTER!



No Brag. Just Fact. WORD WRITER 3 has more features, more power, and is easier-to-use than any other C64 word processor.

***And now the facts!* We've added:**

- **An 85,000-Word Spell Checker** – plus, unlimited sub-dictionaries.
- **An Integrated Thesaurus** with over 60,000 synonyms and alternatives.
- **An Integrated Outline Processor** that quickly organizes notes, facts, and ideas into a convenient outline format.
- **An 80-Column Print Preview Mode**
- **Highlighting:** Prints out your text incorporating underlining, **boldface**, *italics*, superscript, subscript, and more.
- **Headers and Footers**
- **Automatic Program Set-Up:** Configures WORD WRITER 3 to your choice of printer codes, screen colors, and more.
- **SwiftKeys**˙ access commands quickly, using a minimum of keystrokes.
- *. . . and much, much more!*

You Get Free, Ongoing Technical Support

Rest assured. When you show your support by buying Timeworks software, we never stop showing ours. That's why our twelve Customer Support Technicians have been giving our T.L.C. (Technical Loving Care) *for over four years.* And, all our programs have a Money Back Guarantee¨

TIMEWORKS®

More power for your dollar

Timeworks, Inc. 444 Lake Cook Road
Deerfield, Illinois 60015 312-948-9200

¨ Details on every Timeworks package.
˙ Registered trademarks of Commodore Electronics, Ltd., Timeworks, Inc., Berkeley Softworks, Inc.

© 1983 Timeworks, Inc. All Rights Reserved.

Word Writer 3 interfaces with Timeworks' other C64 programs for a complete Productivity System:

- **DATA MANAGER 2** with **Report Writer**
  A highly flexible filing and recordkeeping system that stores, retrieves, sorts, evaluates, and updates large amounts of information. Includes: Report Writing, Graphics, Statistics, and Label Making capabilities.
- **SWIFTCALC** with **Sideways**
  A powerful, surprisingly easy-to-use electronic spreadsheet for home and business use. Plus, with Sideways, prints all your columns on one, continuous sheet – sideways!
- **PARTNER 64**
  A cartridge-based product with eight instantly accessible desktop accessories. PARTNER operates *"concurrently"* with your other C64 software programs.

Available for Commodore 64/128˙ Computers (64K, 40 Column)

Suggested Retail List Prices:

WORD WRITER 3	**$49.95**
DATA MANAGER 2	**$39.95**
SWIFTCALC	**$39.95**
PARTNER 64	**$59.95**

Now at your favorite dealer, or contact Timeworks today.

To Order Call
1-800-535-9497

These Programs Are GEOS* Compatible

Operation Terminal

Operation Terminal by Dreamrider Software is a breakthrough in personal computer software. It's advertised as—and, as far as I can tell, is—the first commercially available modem game with full graphics capabilities. While this Commodore 64 program can be played by one, it's designed to be played by two users at remote locations over their telephone lines. The program adds a new level of excitement to the booming world of home telecommunications.

The program casts its players as spies from competing countries on a secret mission to save the world. On an island in an unknown location lies a mysterious research facility known as the Antimatter Complex, built by an unidentified scientific genius. The research at the complex involves using antimatter as the ultimate energy source. However, antimatter is also the most destructive explosive material known to man. Obviously, your country is very concerned about who gets hold of this research and to what use it's applied.

That's where your character comes in. As one of the nation's top operatives, you must parachute onto the island, retrieve certain research documents and pieces of antimatter, and escape the island. All this must be accomplished within 30 minutes. The only means of escape from the island is a device called the Particle Degenerator, which will convert you into light waves and transmit you off the island.

Your mission has become even more imperative since the scientific genius who built the complex disappeared under mysterious circumstances just before turning over the results of the antimatter research to your country.

The complex is a series of rooms which form a matrix and are joined by hallways. Each room has a wall compartment that may contain a piece of antimatter or one of the documents you are looking for. You do not know which rooms contain the items and, therefore, must conduct a search of each room until you find the required amount of antimatter and documents. Beware, however, for there are booby-trapped rooms that set off bombs by an electronic signal triggered when a door is opened. If you guess wrong and enter a booby-trapped room, the bomb will explode and disable you for about 15 seconds, costing you valuable time and depleting your strength.

To counteract the bombs, you have been equipped with a device that jams the electronic signaling device. The device's power source is a battery that can be depleted, but is rechargeable in one of the complex's rooms known as the Battery Room. Conservation of that power is important to your success, however, since recharging takes time.

Operation Terminal...*adds a new level of excitement to the booming world of home telecommunications.*

The top half of the screen layout provides you with a view of the hallway or the room your character is presently in. When your character is in a hallway, the view is from the ceiling down, and when in a room, a more conventional side view is shown. The bottom half of the screen has a map of the complex's room matrix and shows you where your character is in the building. Several gauges showing time, battery level, strength, and the number of items collected also appear at the bottom of the screen. While movement of the character is by joystick (required for game play), several keys control actions, such as activating the jamming device.

To succeed at *Operation Terminal*, you'll have to use simple but effective strategy, as you must race against the clock to collect the needed items. You must guess which rooms are booby-trapped to conserve battery power in your jamming device, or you will use too much time recharging (or getting disabled by bombs). Your strength can be depleted by opening wall compartments in your search for the items you must collect and, of course, by triggering bombs. If your strength gets too low, you cannot open the wall compartments. Once strength is tapped, you must find the First Aid Room (another special room in the complex) and renew your strength before you can proceed with the mission. Again, having to divert your attention to matters other than collecting the required items will waste precious time. To compound the difficulty of your mission, an enemy agent (the other player) will be attempting the identical operation at the same time. You must complete your mission and at the same time prevent the enemy agent from succeeding with his or hers.

Operation Terminal *is a one- or two-player modem game featuring color graphics.*

The real strategy comes into play with respect to your opponent. No matter how successful you are with your mission, the other player may be capable of beating you. Enough items exist in the rooms to allow both players to meet their requirements. Once one player has collected his or her items and has escaped the island through the Particle Degenerator, the other player's mission timer drops to one minute. The remaining player then has only one minute to both complete the mission and leave the island.

The program offers several tools to help you combat your opponent. One is radar mode, which allows you to spy on your opponent. While in radar mode, your screen shows the location and vital information about your opponent. Further, you are armed with several bombs (as is your opponent) that you can place in any of the rooms to slow your opponent down. The bombs also

can be used to destroy the Battery Room and prevent the recharging of the jamming devices. However, destruction of the Battery Room can backfire on you, since neither player can recharge their jamming device once the Battery Room is destroyed.

As noted earlier, one player can use *Operation Terminal*. In the one-player version, your only enemy is the clock, as you must complete your mission within 15 minutes. The one-player game doesn't require a modem. However, this version suffers from a lack of competitive strategy that the two-player version offers. This criticism is, of course, true of any game offering one- and two-player versions. Frankly, the main utility of the one-player version is that it provides practice for the two-player mode.

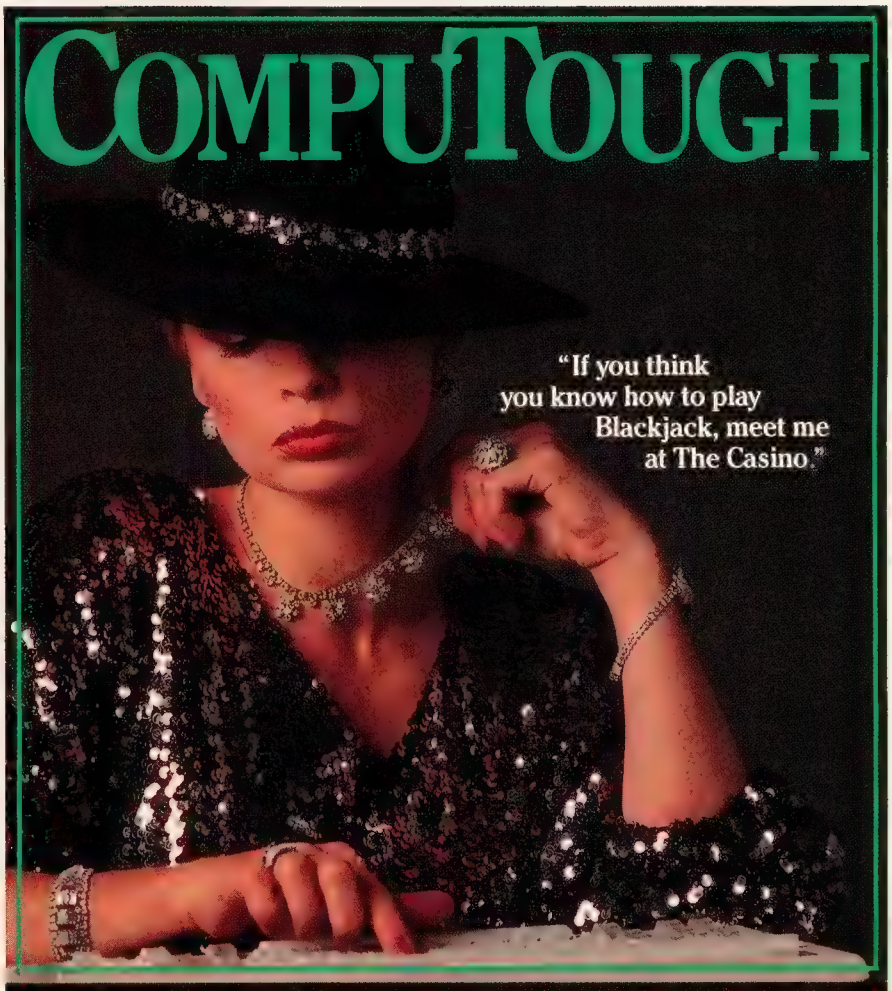
The program works with all the Commodore modems and with many other popular brands. The terminal program is incorporated within *Operation Terminal* and is extremely easy to use. In fact, all the instructions you need are displayed on the screen. Either player may initiate the modem connection. At any time during play, either player may send a message to the other and enter into a message mode until one of the players breaks it off. While in the message mode, the timer on the game stops running.

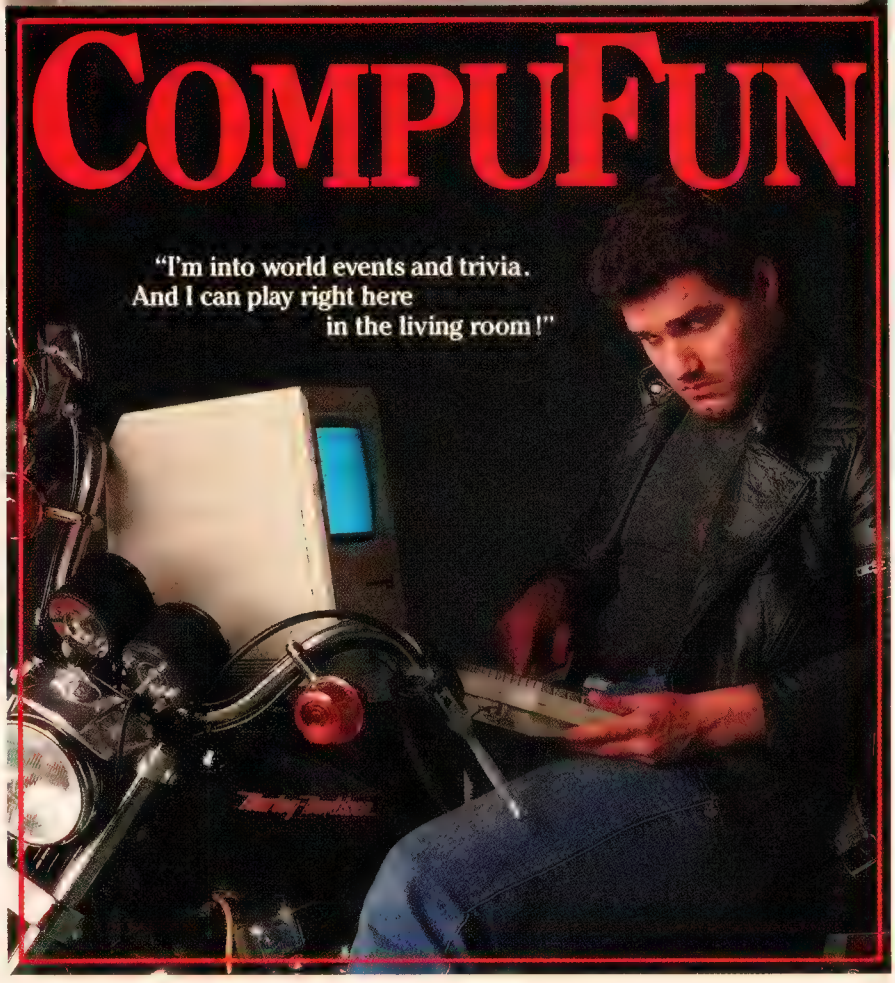
Operation Terminal is a good game, with a simple but interesting plot and enough strategy to keep you involved in the game. The reason to buy it, however, will probably stem from your interest in playing against someone else via the modem. If you have a modem and a friend with one, and you are not able to get together as often as you'd like to play computer games, *Operation Terminal* may just be what you're looking for.

[The manufacturer reportedly offers a bulletin board service that lists the names and players of *Operation Terminal* in your area. —Ed.]

—*Scott Thomas*

Dreamrider Software
970 N. Main St.
Crete, IL 60417
$39.95





Thinking Cap

Late last year, I read an article about a new *outline processor*: computer software that can assist you in creating outlines for projects like school and work reports, books, and magazine articles. My own outlines tend to be informal, and I don't always use them. But the idea of being able to brainstorm and jot down notes at the computer tantalized me. Then I saw the price tag—$450. So I put the article away and dreamed of the day some creative individual would come up with an affordable variation for the Commodore 64.

In December, I said to myself: *I just have to get that book outlined! I'll never be able to submit it if I don't!* The prospect was daunting. Outlining a 20-chapter book is less than thrilling at best, and frightening when you know an editor's decision depends on how lucidly you describe your plot. Then, just before Christmas, I received a copy of *Thinking Cap* by Brøderbund.

Thinking Cap is described as an *outline processor*, or idea processor. You begin in a section of the program called Brainstorm, jotting down ideas as they come to you. You need only have a general idea of what topic areas belong together, because in Brainstorm you can change things around as you go along, making corrections and rearranging subtopics as the thoughts hit you.

You only need a title and your first idea. Through the use of highlighting and windows, you create an outline of up to 16 topics and to a depth of seven levels. The title is level 1; the first major topic is level 2; the first subtopic under a major topic is level 3, and so on. You can work in any order, because you can always open up a window to enter new items under a topic.

When you've gone as far as your creativity will carry you, it's time to review your work. This is done in the Overview section. Here, you view your outline in its entirety, to whatever depth you choose, so that you can see how you are progressing. This means you may view as little as the title, or all of what you've written, or anything in between.

The editing feature is available in Overview, too. This lets you modify your outline, fixing and rearranging text to meet your standards. There are screen prompts to help with some of the more complex moves. A pop-up window lists the editing functions. This window also keeps track of how much memory you have left.

Two editing devices, the Section Safe and Text Safe, are used to store portions of text that you cut away so you can paste them in elsewhere, either to move them or to make copies of a section or block of text. The Section Safe stores a topic, subtopic, or entire section of the outline. The Text Safe stores a block of text from a single topic or subtopic. Other features include Search-and-Replace and the ability to delete entire phrases.

Outlines or sections can be saved to disk. Outlines saved separately can be merged onscreen and printed out together. Sections saved separately can be formed into one coherent outline and resaved as such. A utilities section contains options to format a disk, view the directory, and delete or rename files.

The printing capability of *Thinking Cap* is one of its best features. You can customize to your own preferences and design, whether you're a speech maker, scientist, scholar, or scribe. Two menus handle most of the customizing. An option called Print Enhancements has nine items which may be varied: such things as title and headline emphasis, type of outline (Roman, technical, prose, numbered), title positioning, and so on.

In Thinking Cap, *you concentrate only on your ideas. The program takes care of the mechanics.*

Page Layout has eight page-manipulation variables to work with, similar to the choices offered by most word processor page layouts. A third factor influencing printout is what you display on the screen. When you're using the Hidden Text command, your screen display will show only the first line of each topic or subtopic, replacing the remaining text with an ellipsis. It would be nice if this capability were also a part of the printing function, so you could see where the missing text lay in your hardcopy. That, however, is my only criticism of the program.

You can modify your printout by selecting different depths, thus eliminating the detail of subtopics. You can also suppress any numbering in the outline. There are an impressive number of options offered in these variables, although most users will probably make two or three their favorites, depending on their needs.

What is all the excitement about? Why not just use a word processor and create your own outline? It's a little difficult to describe to someone who hasn't used it, but it's rather like the difference between typing and having a word processor. Think for a minute how long it would take you to center a title on a page with an ordinary typewriter. You need to know your pitch, your paper width, your margins, and the number of letters in the title. You need to calculate where center is; what half the number of letters and spaces in the title is; and what the center point, minus the latter number, is. Then you have to position your paper there. (Or you can go to center, read off the letters and spaces in your title, and backspace for every two.) With a word processor, you merely turn on your centering option.

In *Thinking Cap*, you concentrate only on your ideas. The program takes care of the mechanics. In writing an outline by hand, I get caught up in thoughts about the outline itself, and I can't think clearly about my topic. I also find myself doodling in the margins.

But in the Brainstorm section of *Thinking Cap*, I worry only about my ideas. I know I can go back and edit and move topics around after I have recorded all my thoughts. In Overview I can scan the outline to catch what changes need to be made. For printing, much like a word processor, *Thinking Cap* allows me to format the output to my liking—only here it formats in outline form rather than manuscript. Basically, *Thinking Cap* leaves my mind clear to work on the topic, then worry about the niceties of presentation *after* the real work is all done.

There are more nice features in *Thinking Cap*. There is a clear and helpful manual. There is an option to customize various areas (type of printer, screen color combinations, and others), so that when you load the disk, the program defaults to certain choices. You can use a variety of printers, and adjust for an unusual printer and for different interfaces as well. Finally, *Thinking Cap* accomplishes all of its wizardry through the use of windows. This distinctive approach is a large part of what makes the program so impressive.

I haven't stopped using *Thinking Cap* since I got it. In two days I outlined the half of my book that was already written, plus the next quarter, which was not. I completed the first version of the outline for this article, too. The program is stimulating, versatile, easy to learn, and easy to use. And the price is reasonable—which means that *Thinking Cap* is a good value. It does everything described in the article I read (about the $450 program) smoothly and satisfactorily. And although this is the first outline processor I've tried, I feel no need to look further.

—Robin Minnick

Brøderbund Software
17 Paul Dr.
San Rafael, CA 94903-2101
$49.95

Portal

This product, for the Commodore 64, is a computer novel different from any other computer novel on the market. Barely interactive and completely joystick-controlled, *Portal* is closer than any software yet produced to the experience of sitting back and reading a novel.

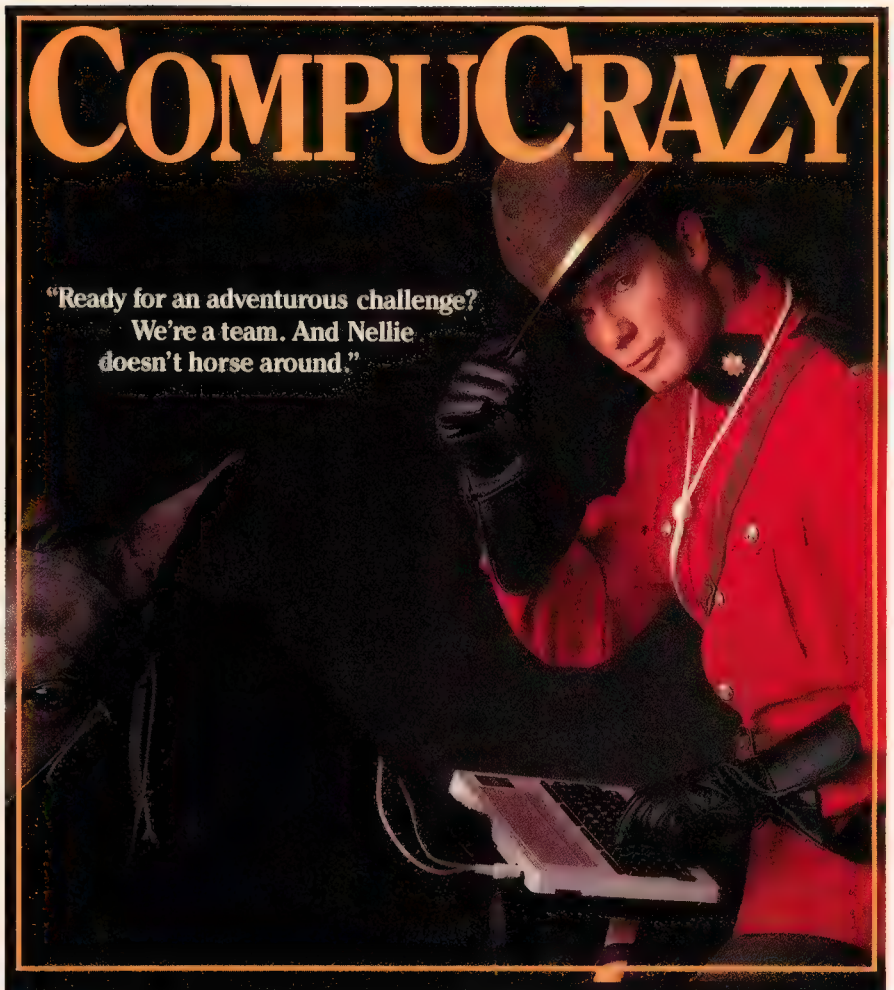
Portal places you in the twenty-second century. As the five-page printed prologue explains, you are returning to earth from a failed space mission, but things at home are not quite right. To be more specific, the planet has no people on it. But there's been no nuclear holocaust, and nowhere are there signs of widespread disease. Instead, the human race has simply disappeared.

Your only link to the past, and thus your only chance of discovering what happened, is a Worldnet computer terminal. Beside the terminal you have found a set of operating instructions (included in the package) with only minimally helpful information. That's it. Somehow, you must try to find out where humanity has gone.

Portal's display is a series of 12 boxes, each with its own graphics design. The boxes represent databases within the Worldnet computer. These databases (or *dataspaces*, as they are called) contain whatever information Worldnet has on the events and characters within the game. For example, the Psychology, Life Support, Wasatch, and Edmod dataspaces contain data about each character that appears in the story, while the Military, SciTech, PsiLink, Geography, History, and Med10 dataspaces store scientific, technological, social, and historical knowledge. The most important of the dataspaces are Central Processing, which offers vital information not found in the other dataspaces, and Homer, the story's narrator.

Homer is Worldnet's "storytelling artificial intelligence." What this means, from your point of view, is that Homer is the dataspace that will recount the tale of what has happened to the human race. As the story progresses, Homer requires information from all the other dataspaces, in order to construct the story of the Portal. Your task in the game is to search through the other 11 dataspaces to retrieve the information for him.

To get this data, all you do is move from dataspace to dataspace (via joystick), entering each dataspace, and reading what has been stored there. After doing so, you return to the Homer dataspace and read the files Homer has created as a result of your searching. These files reveal Homer's story and, just as importantly, his concerns as storyteller. Throughout the story, Homer interrupts the narration to reveal his



COMPUSERVE GAMES
You never know who you'll be up against when you go online with CompuServe.
To buy your CompuServe Subscription Kit, see your nearest computer dealer. Suggested retail price $39.95.
To request our free brochure or order direct, call or write: 800-848-8199
(In Ohio, call 614-457-0802)
CompuServe®
5000 Arlington Centre Blvd
Columbus, OH 43220

doubts about his storytelling abilities, his concerns about humanity, and the nature of truth in fiction.

Portal is, in fact, as much about Homer as it is about Peter Devore, the leader of humanity's Migration. Through a complex and often bizarre plot, one that begins with a simple technological error, Peter Devore enters the wrong dataspace and discovers things he should never be allowed to know. Among these is knowledge of the personality of Wanda Sixlove, a passenger aboard a space ship light years from earth. Through a series of mindlinks, Peter and Wanda fall in love with each other, and Peter spends the next several years trying to find a way to be with her. Somehow, in a way you must discover, that search is bound up with the disappearance of the human race.

The story itself is very good. Extremely well-written, with an intriguing plot, *Portal* offers some of the first truly excellent fictional passages seen on a computer to date. Reading Homer's narrative is a pleasure: The characters are fairly complex and highly believable, and the plots and sub-plots are well-managed. Homer does not tell us everything—what he leaves out we easily fill in for ourselves—but what he does tell is fascinating from start to finish. And the most interesting part of all, the feature that sets *Portal* aside from all other interactive fiction, is that we can see precisely how the story unfolds.

When done properly, interactive fiction makes us feel as if we are contributing to the story. Unlike books, which contain a story that we simply accept from one page to the next, interactive fiction demands that we participate in the creation of the plot. Also unlike books, we never know when the story will end. In interactive fiction, there is no last page.

Extremely well-written, with an intriguing plot, Portal *offers some of the first truly excellent fictional passages seen on a computer to date.*

To reach the conclusion of most adventure games, we must take the role of a character in the story and, by wandering around, talking to other characters, and solving puzzles, force the story towards its conclusion. In one way, such participation is satisfying, because we are allowed to directly influence the plot's outcome, but for those who like reading books, the sheer length of the adventure can be frustrating. *Portal* solves this problem in two ways. First, you are not part of the story of the Migration. Second, you don't really change the course of the plot.

In *Portal*, your only function is to get Homer the information he needs to tell the story. Then, for the most part at least, you sit back and read. As simple as this sounds, though, your actions in the game—going from dataspace to dataspace—are the game itself. You are not a character in the story, but instead you are watching the process of the telling of the story. Each piece of information you dig up is necessary to Homer's narrative; once you have found the information, you return to Homer and discover how he has put it into the story. In other words, you watch the story write itself.

Those expecting a graphics-and-text adventure along the lines of *Tass Times in Tonetown* will perhaps not appreciate the lack of direct participation in the plot, while those who want a graphics adventure such as *Ultima IV* will not enjoy the absence of role playing or the short duration of *Portal*. *Portal* can be completed in about the same length of time it takes to read a fairly long novel. Like all adventures, it is of limited usefulness after its completion, but unlike most, it can be reread with enjoyment.

Still, I recommend *Portal* with some reservation. If you want to see what can be done with a computer story, by all means pick it up. If you want a lengthy adventure with elements of role play, however, don't. *Portal*'s strength is its realization that text adventures don't really take the place of a good novel. It bills itself as a computer novel, and that is precisely what it is. Perhaps a little expensive for a novel, *Portal* offers a reading experience that is unique in computerized fiction.

—Neil Randall

Activision
2350 Bayshore Frontage Rd.
Mountain View, CA 94043
$39.95

COPY II 64/128

BACKUP PROTECTED SOFTWARE FAST.

From the team who brought you Copy II Plus (Apple), Copy II PC (IBM) and Copy II Mac (Macintosh) comes a revolutionary new copy program for the Commodore 64/128 computers.

- Copies many protected programs—automatically. (We update Copy II 64/128 regularly to handle new protections; you as a registered owner may update at any time for $15 plus $3 s/h.)
- Copies even protected disks in under 2 minutes (single drive).
- Copies even protected disks in under 1 minute (dual drive).
- Maximum of four disk swaps on a single drive.
- Includes fast loader, 12-second format.

Requires a Commodore 64 or 128 computer with one or two 1541 or 1571 drives.

Call 503/244-5782, M—F, 8—5 (West Coast time) with your VISA in hand. Or send a check for $39.95 U.S. plus $3 s/h, $8 overseas.

$39.95

Central Point Software, Inc.
9700 S.W. Capitol Hwy. #100
Portland, OR 97219

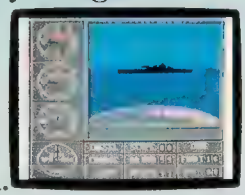
Central Point Software INCORPORATED

Backup utilities also available for the IBM, Apple II, Macintosh and Atari ST.
This product is provided for the purpose of enabling you to make archival copies only.

TEST DIVE ONE FOR YOURSELF.

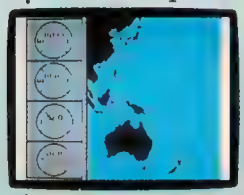
In their day, they ruled over three quarters of the earth's surface.

During WWII, they viciously brought Britain to her knees. And Japan to the ground.



These were the silent killers: Tench. Gato. U-Boat.

And now, they return. In this, the most realistic, all-encompassing simulation ever created for the personal computer.



You will command one of six types of American subs or German Kriegsmarine U-Boats, during any year from 1939 to 1945. You'll perform one of over 60 missions. Or you'll engage in the most difficult task of all: To make it through *the entire war.*

Each vessel is completely unique and painstakingly authentic, so you'll have a lot to learn: Navigation. Weather. Radar.

And the contents of a vital target book, among other things.

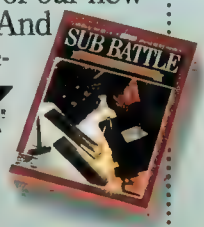
Your arsenal will include deck and anti-aircraft guns. Torpedoes. And mines.

But even all that may not be enough.

Because besides the risk of bumping a depth charge or facing a killer Destroyer, you'll still have to contend with the gunfire of enemy aircraft.

No simulation has ever had the degree of authenticity, gut-wrenching action or historical accuracy of this one.

The first release of our new Masters Collection. And a challenge of unbelievable depth.



EPYX

Apple II & compatibles, Apple IIGS, Atari ST, C64/128, IBM & compatibles, Macintosh.

TAKE OUR PREVIEW DISK FOR A SPIN. Drop this coupon in the mail with your check or money order, and we'll gladly send you to the South Pacific to have it out with an enemy fleet.

Mail to Sub Battle Preview, P.O. Box 8020, Redwood City, CA 94063.

	Quantity	Total
Apple II & compat. (128K)	_____	$1.50 ea. _____
Commodore 64/128	_____	$1.50 ea. _____
IBM PC & compat.	_____	$1.50 ea. _____
Atari ST	_____	$2.75 ea. _____
Macintosh	_____	$2.75 ea. _____
Apple II GS	_____	$2.75 ea. _____
Total Disks Ordered	_____	Total Enclosed _____

Name _____ Phone ( ) _____

Address _____ Age _____

City/State/Zip _____

Canadian orders please add 50¢ for additional postage.

Please allow 4 to 6 weeks for delivery. Offer expires 8/30/87 and is valid only in the continental U.S. and Canada. Void where prohibited.

20

The No. 1 battery. The ship's heart.

Sea guard radar stub.

Your ammo.

The 360° periscopes.

The sealed control room. Your HQ.

Independent generator & diesel engines.

Salt water tank, for trimming and compensating.

5" 25 cal. gun.

Officer's quarters.

Water purification.

Gunship

Helicopters are playing an increasingly important role in modern military tactics. The U.S. Army is beginning to fly what may prove to be the most technologically advanced aircraft to date—the Apache helicopter gunship, a flying arsenal. Equipped with laser-guided Hellfire missles, a 30mm cannon (which is controlled by helmet gunsights), clusters of unguided rockets, and even Sidewinder missiles for air-to-air combat, this awesome craft is more than a match for most situations.

With *Gunship*, MicroProse Software puts you at the controls of an AH-64A Apache, America's most advanced helicopter, and gives you the chance to fly any of a number of missions. *Gunship*, for the Commodore 64, is a very well-executed simulation, not just a game. Real pilots "fly" missions in sophisticated simulators which utilize extremely powerful computers with dazzling graphics and realistic sound. These simulators permit pilots to experience aerial emergencies and combat situations without real risk. Obviously, the graphics capabilities of your 64 are no match for these simulators, but you'll see much more than simple stick figures with *Gunship*. For example, the three-dimensional graphics increase the sense of motion as you fly. All in all, the graphics are among the best I've seen for any flight simulation on an eight-bit computer.

As in real life, you should not expect to jump into this Apache helicopter and fly off into combat without some preparation. Read the manual carefully, then start out by taking flight training. Become familiar with the controls by flying a number of practice missions. Then head into combat in Southeast Asia, Central America, the Middle East, or—the ultimate test for any pilot—the USSR and its Warsaw Pact allies.

Even flying training missions has some risk. You'll make a lot of mistakes as you work to master the use of your weapons systems and on-board avionics. Take your time and learn well. You'll need the training later. Soon you'll be skimming the treetops at 200 mph as you wait for your AGM-114A Hellfire missile to lock onto target. The effect of firing the 30mm cannon is so realistic that you'll notice a slight loss in speed as you fire, due to the recoil of the weapon.

Another realistic aspect of the simulation occurs when you trim the gunship to maintain a constant altitude as you fire. In fact, you'll have your hands full just controlling the helicopter at first, not to mention dodging the surface-to-air missiles (SAM) and the enemy choppers in the area.

There are 29 optional settings for arming your weapons and flying the gunship, and it's tough to remember which keys control them all. Fortunately, *Gunship* makes it a lot easier by providing a keyboard overlay with labels for all the keyboard controls.

As the simulation begins, you'll need the manual, which is excellent and provides much information for the novice pilot. As an indirect form of copy protection, you're shown a drawing of a piece of military equipment on the screen and are asked to identify it from the manual. That's not difficult, but it does take a minute or so to look it up. Personally, I don't mind this form of copy protection. Just remember that you need the manual to run the program.

...MicroProse...puts you at the controls of...America's most advanced helicopter, and gives you the chance to fly any of a number of missions.

Gunship...*is a very well-executed simulation, not just a game.*

After the copy protection check, you're shown a summary of the last mission flown. Now is the time to change any statistics to make the upcoming flight easier or to increase its overall difficulty. The more dangerous the mission, the greater the score you can achieve. Flying difficult missions also leads to faster promotion and more honor, but it also increases your chances to be listed as KIA (Killed In Action) on the pilot roster.

You'll step through several screens, selecting a difficulty level then finally receiving your preflight briefing. You'll probably want to check the map while you're here. It's always a good idea to know where any friends might be located. After all, you don't want to hit them by mistake. And if you're hit, you might need a location near them for an emergency landing.

Finally, you're settled into your chopper, gazing at the control panel display. Glancing at the bottom of the screen, you see fuel levels, warning lights and gauges, a compass, and other pertinent items. It's best to become somewhat familiar with the locations of these gauges before firing up. Once airborne, things happen quickly. Check your weapons display and notice how many of each type of armament you're carrying. Take note of the location of the Threat display in the lower left corner of the screen.

A view from the cockpit in MicroProse's Gunship.

The development of *Gunship* was a long and complex project for MicroProse. In fact, an earlier version of this helicopter simulation was reportedly sent back to the drawing boards when the finished product didn't measure up to the expectations of company president William Stealey and MicroProse designer Sid Meier. After almost a year, the present version was released.

Was the wait worth it? Very simply, yes. In the tradition of *Solo Flight*, *F-15 Strike Eagle*, *AcroJet*, and *Silent Service*, MicroProse has another winner.

—George Miller

Gunship: The Helicopter Flight Simulation
MicroProse
120 Lakefront Dr.
Hunt Valley, Md. 21030
$34.95

All programs listed in this magazine are available on the GAZETTE Disk. Details elsewhere in this issue.

The Great Communicator

THE Direct connect Hayes/Commodore® 1670 compatible 1200 Baud modem for ONLY $119.95

Now that you're able to do all those stand alone applications with your Commodore, like word processing, spread sheet analysis, and many others, you are probably thinking "It would sure be nice if I could expand the amount of data I have access to." You are quite right, everything from Electronic Mail (E-mail) to stock quotes and huge databases of every imaginable type is now on line to the small computer owner. You can even send and receive telexes anywhere in the world. All you need is a telephone and a modem which allows your computer to communicate with others through these many services.

The next question is: "Which modem is best for me?" Let me first say that almost all modems (and services) are set up to communicate in one of two speeds; 300 and 1200 Baud. If you look around you will find that there is a flood of 300 baud modems on the market and sometimes at very low prices. The reason is simple, they are being dumped because most computer users prefer 1200 Baud. (1200 Baud is about 4 times as fast which means you spend less time and money getting the data you want and more time enjoying it.) Virtually everyone who has a 300 would rather have a 1200. You will also notice a few very cheap 1200s on the market at "too good to be true prices". They are. The reason is that they are either not truly Hayes and/or Commodore compatible therefore not usable in all situations and all services. The Aprotek-1200C is both Hayes and Commodore compatible and 1200 baud. Why not get a modem that will satisfy your present AND future needs by going directly to an inexpensive Aprotek-1200C especially when we have it on sale?

What do you get for $119.95? Everything! You don't need to worry about cables, compatibility or anything else! We don't just sell hardware, we sell solutions. The Aprotek 1200C plugs directly into your Commodore Vic-20, C-64, C-64C or C-128 user port. It is unique in that it has two separate (switchable) emulation modes (Hayes and Commodore 1670) to make it compatible with all available software. The Aprotek 1200C is a full feature, 300 and 1200 Baud modem with Auto Answer, Auto Dial. Touch-Tone or rotary dialing, has the full complement of 8 status LEDs on the front panel and has a built in speaker with volume control. Just plug it into your computer and standard phone jack with the supplied cables. Also included is a free trial offer subscription to Quantum-Link, a very useful Commodore user database with local access numbers and about every feature imaginable.

Do you have more than one computer or do you plan to get another computer? You can have your cake and eat it too. Simply order our Universal RS-232 interface #5232 along with the standard Aprotek-1200 which you can use with any computer that has a RS-232 serial port as well as your Commodore. The Universal RS-232 interface can also be used to connect your Commodore to any other RS-232 device.

NO RISK POLICY

Try the Aprotek 1200 for two weeks and if you are not satisfied, send it back for a prompt refund.

The bottom line:

Aprotek 1200C (for Commodore)
order #1200C $119.95

Aprotek 1200 (for RS-232 with DB-25)
order #1200 . . . . . $119.95

Aprotek USR-232 (Commodore-to-RS-232
Interface order #5232 . . . . . $ 39.95

Modem shipping – Cont. US $5.00, UPS Blue $10.00
USR-232 shipping – Cont. US $3.00, UPS Blue $6.00

ORDER INFORMATION California residents add 6% tax. All prices are cash prices—VISA and MC add 3% to total. We ship the next business day on money orders, cashier's checks, and charge cards. A 14-day clearing period is required for checks. Prices subject to change— CALL. Dealer inquiries invited.

For information and in Calif. call **805/987-2454**

TO ORDER CALL TOLL FREE

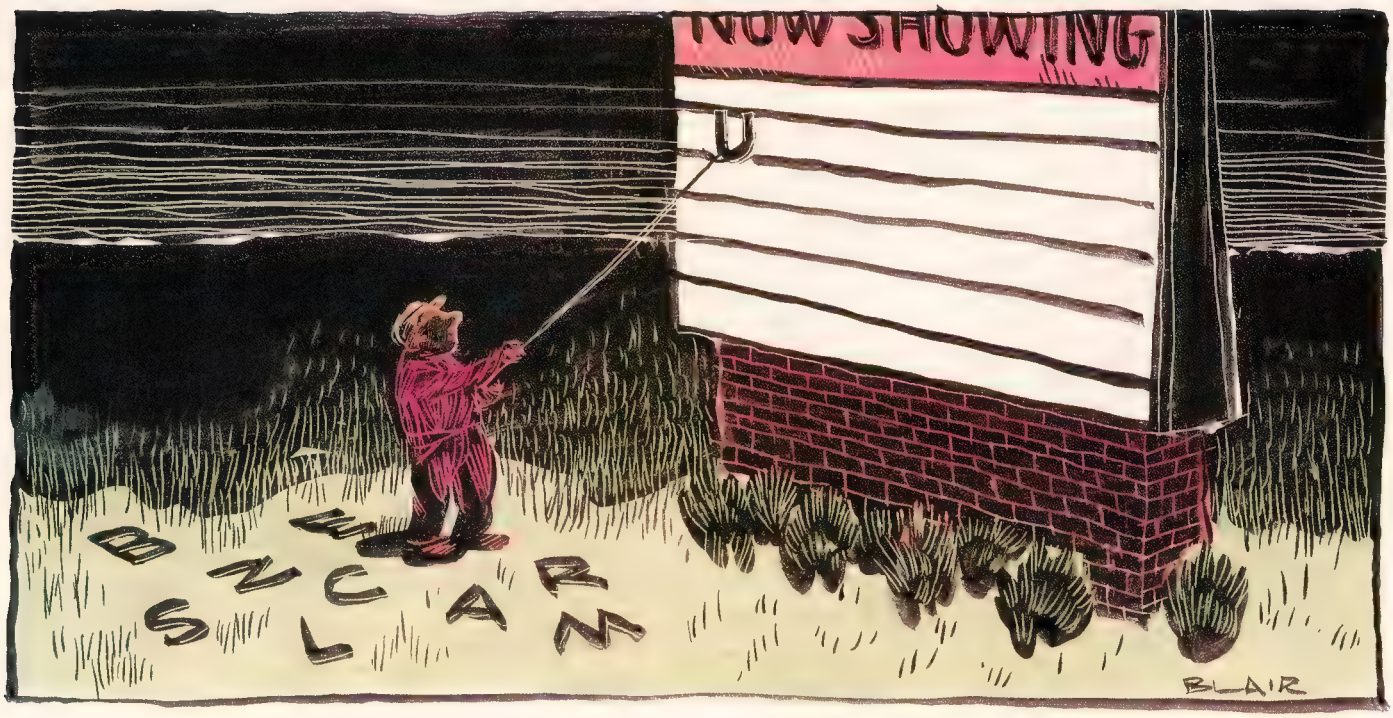
1 (800) 962-5800 - USA

(7-7 PST)

Or send order to:

APROTEK DEPT. CG

1071-A Avenida Acaso, Camarillo, CA 93010



Unscramble

Mark Tuttle

If you like word challenges, you'll like this two-player game where quick thinking and accurate guesses determine the winner. For the Commodore 128, 64, Plus/4, and 16.

Computers are traditionally known for their mathematical capabilities. Only recently, with the advent of word processors and spelling checkers, have computers affected the way we deal with words. With "Unscramble," you can use your Commodore to challenge a friend to a word game traditionally played as a board game or with pencil and paper.

Each player must guess five words which were entered by his opponent and scrambled by the computer. It sounds easy, but there is one obstacle—time. A timer runs while you think, and ten seconds are added to your score every time you guess a wrong letter. The winner is the player with the lowest score.

Typing It In

Unscramble is written entirely in BASIC. If you use a 64, type in the program as it is listed in the back of the magazine; 128 users must make the change indicated in line 10 of the listing. Plus/4 and 16 users must substitute these lines for the corresponding lines of the 64 program:

```
GB 1Ø COLORØ,2,4:COLOR4,7,2:CO
     =-1Ø24:SC=3Ø72:NDX=239
XM 2Ø VOL7
BR 66Ø SOUND1,PA*15,UPS/1Ø:RET
     URN
```

After typing the program, save it with a command of the form

SAVE"UNSCRAMBLE",8

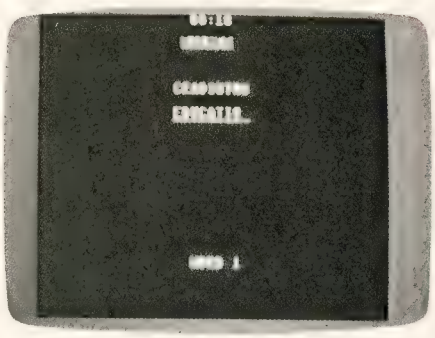
(Tape users should substitute a ,1 for the ,8.)

After saving a copy, load it with the command

LOAD"UNSCRAMBLE",8

(Tape users should substitute a ,1 for the ,8.)

Now, type RUN. Unscramble asks for the names of the players. After you enter the names, player 1 types in five words while player 2 looks away. (For a fair game, be sure that each player turns his head while the other player types in the words.) Words can be no longer than 15 characters. When player 1 has finished entering his words, player 2 sits at the computer to unscramble the words. Each scrambled word is displayed at the top of the screen. Player 2 must guess each letter in the word from left to right. If he guesses a wrong letter, a penalty of ten seconds is added to his score.



In "Unscramble," two players race the clock to decipher each other's words.

When player 2 has finished unscrambling the words, he enters five words for player 1 to unscramble. When player 1 has successfully unscrambled the words entered by player 2, the winner is announced and the game ends.

See program listing on page 94.

COMPUTER VICE

226 Lincoln Road
Miami Beach, FL 33139

Blue Max
New York City/Air Support
Zaxxon
Zepplin
Zepplin $6.77

Musicalc 1
Musicalc 2
Musicalc 3
Template 1 (Afro/Latin)
Keyboard
Christmas Diskette $6.77

Super Expander
Simons Basic
Nevada Cobol
Jupiter Lander
Kickman
Seawolf
Speed Bingo Math
Radar Rat Race
Visible Solar S.
Blue Print
Lazarian
Omega Race
Wizard of Wor
Le Mans
Gorf
Supermash
Strapost
Frogmaster
Star Ranger $4.77

Satans Hollow
Hulk
Avenger
Clowns
Fish Metic
Number Nabber
Pet Emulator
Pinball Spectacular
Solar Fox
Tooth Invaders $5.77

English II
English III
English IV
English VI $5.77

English SAT I
English SAT II
Math SAT I $9.77

Songwriter
Phi Beta Filer
Mastertype Fig. & Formulas $7.77

Triad
Zork I
Zork II
Zork III
Suspended
Starcross
Deadline $4.77

Manager
Magic Desk I
Easy Finance I
Easy Finance II
Easy Finance III . . . $12.77

Jyruss
James Bond
Star Wars-Arcade Game
Q Bert
Popeye
Frogger
Frogger II Threedeep . . . $6.77

Comm Step By Step
Comm Step By Step
Picture Blocks
Preschool One
Reading What's Diff.
Vocabulary Builder I
Bocabulary Builder II
Wordwise-Analogies $3.77

Practicalc 64
64 Doctor
Practifile $14.77
(Database Manager)

Castle Wolfenstein
Rescue Squad
Beyond Castle Wolfenstein
Space Taxi
Smart Start (Utility)
New Super Text . . . $6.77

Diamond Mine
Castle Hastle
Rack 'Em Up . . . $4.77

Basic Coach
Computer Coach
Keyboard Coach
Speedreading Coach
Typing Coach $7.77

Totl Text 2.6
Totl Label 2.6
Time Manager 2.6
Research Assistant 2.0
Totl Speller 36
Totl Infomaster $3.77

Zortek Microchip
Easy Lesson/Quiz
Number Nabber/Shap Grab
Chopper Math
Type Write
Music Machine
Music Composer
Gulp!!/Arrow Graphics
Frenzy/Flip Flop
Next Letter or Num
Ltr Match More/Less . . . $4.77

Retro Ball
Hes Mon 64
Hes Writer 64
6502 Prof. Dev. Sys.
Turtle Graphics II
Gridrunner
Benji Space Rescue . . . $8.77

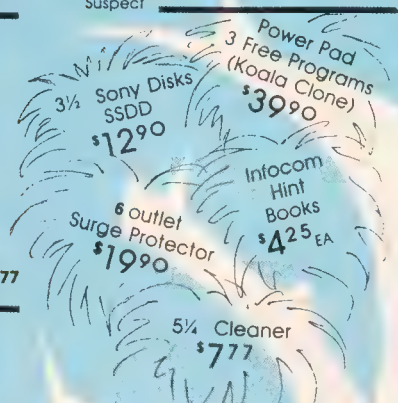
Codewriter
Adventure writer
File writer
Dialogue
Elf
Home Integrator
Thriller Series
Adventure Writer . . . $14.77

SUPER CLOSEOUTS

Sales Edge
Management Edge
Negotiation Edge
Communication Edge
General Ledger . . $~~79.95~~ NOW $14.77 EA
ALL 5 for $59.77

INFOCOM FOR ATARI ST

Cutthroats
Zork I
Zork II
Zork III
Planetfall
Spellbreaker
Suspended
Suspect
Your Choice 22.00 EA



Intro to Basic I $7.77

Omni Calc
Multiplan $12.77

US Constitution
Death in the Caribbean
Heist
Boulder Dash $9.77

Easy Finance
Word Name Machine
Accounts Receivable
Accounts Payable $12.77

Starcross
Deadline
Suspended $9.77

SPECIAL

Jet by Sublogic . . . $14.77
1986 Taxpayers Survival . . $7.77
Tax Planner $8.77

ORDERS ONLY

1-800-331-7054

CUSTOMER SERVICE OR IN FLORIDA (305) 538-1364

FREE FREIGHT ON ALL ORDERS WITHIN CONTINENTAL U.S. OVER $100.00

Orders under $100.00 add $4.00 shipping and handling. C.O.D. orders add $4.00.
Prices reflect a 3% cash discount. A.P.O., F.P.O. orders add 6% shipping & handling. Postal orders shipped surface
Add 6% for air shipment. Add 3% for VISA/MC. Florida residents add 5% sales tax. Personal checks allow 2 weeks for processing
Prices Subject to Change Without Notice

ORDERS RECEIVED BEFORE 12:00 PM WILL BE SHIPPED SAME DAY.

Powerball

William Chin

This outstanding arcade-style game's moving obstacles, special features, and different game screens will keep you thinking and moving fast. For the Commodore 64. A joystick is required.

Not your ordinary version of *Breakout*, "Powerball" is an addictive, multifaceted arcade-style game with new features such as *capsules* and *slivers*—and ten different screens to master.

Each Powerball screen is populated by its own configuration of slivers, capsules, and bricks. After a few games you'll begin to develop strategies for each of the screens. As in *Breakout*, the object of the game is to destroy a series of walls brick by brick. In Powerball, this can be done in two ways—you may use your paddle to bounce balls against the wall, and you may shoot the wall down after catching a *fire* capsule. Unlike *Breakout*, you must quickly observe the characteristics of each type of screen object to earn high scores.

Typing It In

Powerball is written in machine language, so you'll need to use "MLX," the machine language entry program found elsewhere in this issue. When you run MLX, you'll be asked for the starting and ending addresses of the data you'll be entering. For Powerball, respond with the following values:

Starting Address: C000
Ending Address: CD67

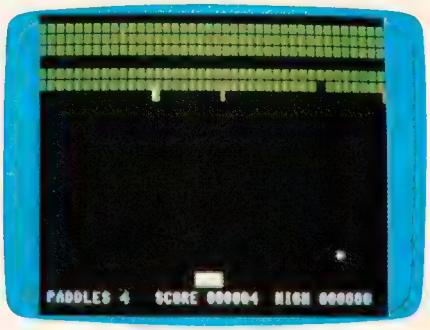
When you've finished typing in the data, save a copy to tape or disk before leaving MLX.

To play Powerball, enter LOAD"POWERBALL",8,1 (tape users should use LOAD"POWERBALL",1,1). Substitute the name you used to save the file. Start the game with SYS 49152.

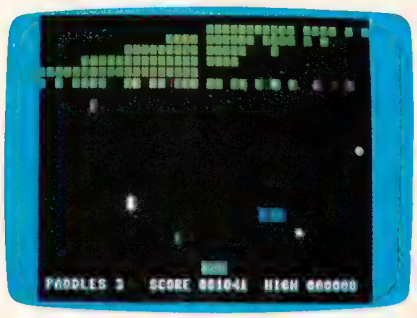
When the game begins, you'll see a paddle in the center of the screen near the bottom. Below the paddle you'll see an indication of the number of paddles remaining, your current score, and the high score of the current series of games. You begin each game with four paddles available (only one paddle can be active at any given time, however). Use a joystick in port 2 to move the paddle left and right. Press the fire button to release the ball and begin play.

Blasting Bricks

Your main weapon against the bricks is the bouncing ball. Use your paddle to keep the ball in motion. You'll lose a paddle whenever a ball gets past you to the bottom of the screen. The game ends when all paddles have been lost. When all breakable bricks on the current level have been eliminated, you advance to the next level. When you lose all your paddles, you are *not* automatically dumped back to the first level. Instead, you can press the fire button to start a new game at the current level. You can press SHIFT at any time to pause the game. (Use SHIFT-LOCK for longer pauses.)



Here's a scene from early in the game. Only one brick has been knocked out of the first wall. The three slivers are visible just below the wall.



Here, the player is using two balls to chip away the wall. An L capsule is rolling down the screen. If the player can catch it, his paddle (the gray bar at the bottom) will double in width.

Bricks come in three varieties: soft, hard, and solid. Soft bricks are green and are destroyed by being shot or by being hit by a ball. Hard bricks start out gray and change color each time they are hit. They must be turned green before they can be destroyed. Solid bricks are white. They can be destroyed only by a power ball. However, it's not necessary to destroy all the white bricks to advance to the next round.

Slivers And Capsules

Slivers and capsules are the special features that distingush Powerball from most other games of its type. Slivers are small flashing objects that change color as they float around the screen. Balls bounce off the slivers. This can be helpful at times (to deflect a descending ball), but, in general, slivers do more damage than good. Touching a sliver with your paddle sends the sliver to the top of the screen where it is least dangerous. There is no way to permanently destroy a sliver.

Capsules are the same shape as your paddle. They appear at random times and at random locations near the top of the screen, and then descend vertically down the screen. Touching a capsule with your paddle gives the paddle a special ability depending on the color of the capsule. (If you're using a monochrome display, each type of capsule also has a distinguishing label.) Below is a list of the capsule types and their corresponding powers:

Label	Color	Power
S	yellow	slows down all balls
C	green	paddle catches ball
L	blue	paddle becomes longer
F	red	paddle fires
P	purple	ball becomes power ball
3	lt. blue	ball splits into three balls
*	gray	extra paddle
N	orange	go to next screen

A standard paddle with no special powers is white. When a capsule is touched, the paddle takes on the color of the capsule to indicate its current power. A paddle can have only one power at a time; the previous power is lost each time a new capsule is touched. The special power is also canceled when the paddle is lost.

A few notes about the powers: When you've caught the green C capsule, your paddle will capture the ball so that you can reposition the paddle for an accurate shot. Press fire to release the ball. If you wait too long (about three seconds), the ball will be released automatically. The purple P capsule turns the balls into power balls, which destroy *all* types of bricks. After you capture a red F capsule, your paddle has the power to fire darts at the bricks as well as to deflect the ball. Press the fire button to shoot the darts. The light blue 3 capsule splits the ball into three individual balls (but only once each time one of these capsules is touched—you'll never get more than three balls). The split balls behave the same as the original ball, except that you don't lose a paddle until *all three* of the split balls have slipped past to the bottom of the screen. The gray * capsule adds an extra paddle to your total when touched. Touching an orange N capsule takes you to the next level, regardless of how many bricks remain on the current level. The gray * and the orange N capsules are rare.

See program listing on page 93.

DATA CHIEF™

What C-64* & C-128* USERS HAVE BEEN WAITING FOR!!

HARD DISK SYSTEM W/ FLOPPY

10 MBYTE DRIVE
Stores 60 Floppies!

- FAST
- EXPANDABLE
- TRANSPARENT OPERATION
- MULTIPLE CHAINED PARTITIONS
- GEOS** COMPATIBLE
- SUPPORTS SINGLE SIDED C-128 AND CPM
- BUILT-IN FLOPPY DRIVE
- SUPPORTS ALL 2.0 TO 7.0 (C-128) DOS COMMANDS
- REPROGRAMMABLE "BOS PAK"™ (BUFFERED OPERATING SYSTEM)

20 Mbyte Model HFD-20
ONLY $995.00

10 MBYTE MODEL HFD-10
ONLY $895.00

5 MBTYE MODEL HFD-5
ONLY $695.00

The DATA CHIEF has been designed by C-64 users for C-64 users with important features like
Storage in original individual disk format
— Easy Access to programs via Disk Number
— Example for disk # 60 'OPEN 15, 8, 15, "H60'
Standard Utilities Included
— Includes Wedge Commands
135 Watt Power Supply
Metal Enclosure houses up to 3 each 1/2 Ht Hard Disks
— Provides Excellent Monitor Stand 'P C style
— Allows room for future expansion
Complete Operating Manual
1 Year Full Warranty

The DATA CHIEF is perfect for software and hardware developers, business users, students, and serious computer experimenters as well as for bulletin boards and data base systems
TO ORDER SEND CERTIFIED CHECK OR MONEY ORDER TO

I. Con. Trol Inc
103 BAUGHMAN'S LANE
SUITE 301
FREDERICK, MD 21701

Maryland residents add 5% sales tax
For more information call
(301) 371-4000
Allow 4-6 weeks delivery (U S Only)
* C-64 & C-128 are trademarks of Commodore Electronics, Ltd
** GEOS is a trademark of Berkeley Softworks

ULTRABYTE

V3.0 ULTRABYTE DISK NIBBLER

NEW SIXTH GENERATION ULTRABYTE COPIER FOR COMMODORE 64 and 128 (in 64 mode)

- Copies 99+% of protected software in 2 min. or less includes parameters for 160 recent, hard-to-copy disks. (Send stamped envelope for list). Includes fast file copy program
- Uses 1 or 2 1541 /1571 drives, or MSD dual drive
- More powerful than KeyMaster, Diskbuster, Copy II, Superkit, 21 Second, Clone or Cracker
- Copies itself (for this reason, no refunds given)

SPECIAL — BUY A NIBBLER V3.0 AND GET YOUR CHOICE OF A FREE $14.95 PROGRAM
$39.95 plus $4.00 shipping

Disk Surgeon -- disk utility $14.95
Ultramail -- mail list and label printer.....$14.95
McMurphy's Mansion -- text adventure $14.95
Handy-Capper -- race handicap system ...$14.95

(Above may be ordered separately for $14.95 plus $4.00 shipping. Foreign orders add $2.00)

Mastercard, Visa, Check or M.O., Calif. add 6.5% ($2.60) sales tax. Foreign orders / COD add $2.00. Payment must be in U.S. funds

UPDATES - Return your original Ultrabyte disk with $10.00 plus $4.00 shipping. Foreign add $2.00

To order, write or call 24 hr. order line. For info. write.
ULTRABYTE (818) 796 - 0576
P.O. Box 789 LaCanada, CA 91011 USA

DEALERS & DISTRIBUTORS WANTED

Lyco Computer

Marketing & Consultants

Since 1981

Lyco Computer is one of the oldest and most established computer suppliers in America. Because we are dedicated to satisfying every customer, we have earned our reputation as the best in the business. And, our six years of experience in mail-order computer sales is your assurance of knowledgeable service and quality merchandise.

We fill 95% of all orders every month. Here's how: ● lowest prices anywhere ● multimillion $ factory fresh inventory ● courteous, knowledgeable sales staff ● 24-hour shipping on in-stock items.

Plus: ● free shipping in U.S. on prepaid cash orders ● no deposit on C.O.D. orders ● no sales tax outside PA ● full manufacturers' warranties apply ● air freight, UPS Blue/Red shipping available.

Call Lyco Computer. See for yourself why so many customers keep coming back to Lyco for the best prices, the most complete inventory, and our fast and courteous service.

To order, call toll-free:
1-800-233-8760
In Penna.: 1-717-494-1030
Customer Service:
1-717-494-1670

Or write:
Lyco Computer, Inc.
P.O. Box 5088
Jersey Shore, PA 17740

MasterCard VISA

Risk-Free Policy: ● prices show 4% cash discount; add 4% for credit cards ● APO, FPO, international: add $5 plus 3% for priority mail ● 4-week clearance required on personal checks ● compatibility not guaranteed ● return authorization required ● we check for credit card theft

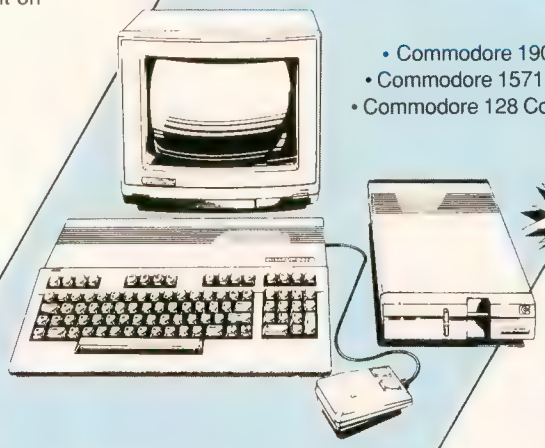
Price and availability subject to change without notice.

System Specials

Complete COMMODORE 128 System

- Commodore 1902 A monitor
- Commodore 1571 Disk Drive
- Commodore 128 Computer

$759



Complete COMMODORE 64C System

- Commodore 64 C Computer
- 1541 C Drive
- Seikosha SP-1000 VC Printer
- 2 joysticks

(90-day Warranty)
(reg. $789)

$509

SUPER PRICES ON HARDWARE!

COMMODORE HARDWARE

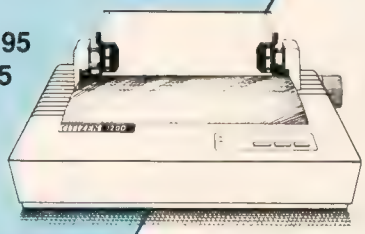
128 Computer	$275	C-1700 128K RAM	$109.95
1571 Disk Drive	$229	1750 RAM	$169.95
64C Computer	$175	Indus GT C-64 Drive	$179
1541 C Disk Drive	$185	GEOS	$CALL
1902 Monitor	$285	C-1351 Mouse	$39
1802C Monitor	$189	1670 Modem	$99

1-800-233-8760

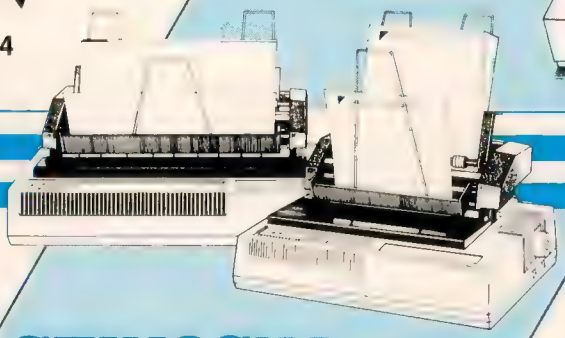
PRINTERS

Citizen 120-D . . .$179

Panasonic 1080i . .$195
Star NX-10 . . . . . $195
Star NP-10 . . . . . $169

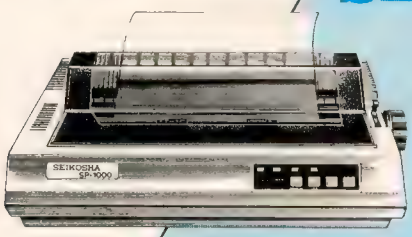


Seikosha SP1000VC . . $154
Seikosha SP1200Ai . . .$195



GREAT DEALS ON PRINTERS!

SEIKOSHA



SP 1000AP IIc $179
SP 1200AS R5232 . $195
SL-80Ai $375
MP 1300Ai $439
MP 5300Ai $549
BP 5420Ai $1075
1300 Color Kit $119
BP-5420 Ribbon . . $12.50
SP-1000Ribbon $8.50

LEGEND

808 . . . . . $159
1080 . . . . . .$199
1380 . . . . . .$229
1385 . . . . . $289

Toshiba

321 P/S $479
P341E $699
P351 Model II . . . . . .$CALL

OKIDATA

an OKI AMERICA company

Okimate 20 . . . . . $129
120 NLQ $209
292 w/interface $539
293 w/interface $679
182 . . . . . .$235
192+ $365
193+ $559

star micronics inc

Panasonic

NX-10C $209
NL-10 . . . . . $229
NX-15 . . . . . .$329
NB-15 . . . . . .$889
SD-10 . . . . . .$259
ND-15 . . . . . .$425
SR-10 . . . . . $469
NR-15 . . . . . .$529
NB24-15 . . . . . .$729
1091i $269
1092i $335
1592 . . . . . $399
1595 . . . . . $499
3131 . . . . . $249
3151 . . . . . $379
1080 AP IIc $239

JUKI

R5232 serial board $55
Juki 6300 . . . . . .$739
Juki 6100 . . . . . .$399

Monitors

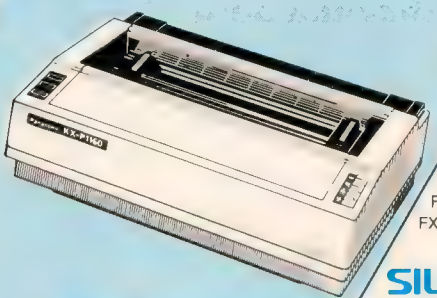
Teknika
MJ-305 . . . . . .$309
MJ-503 . . . . . $529

Zenith
ZVM 1220 . . . . . .$89
ZVM1230 . . . . . .$89

Panasonic
TR-122 MYP 12" Am TTL . .$139
TR-122 M9P 12" Gr TTL . . .$139

Commodore
1902A Color $285
1802 C $189

NEC
Multisync $569



EPSON

LX 86 . . . . . .$209
EX 800 . . . . . .$355
EX 1000 . . . . . .$579
LQ 800 . . . . . .$449
LQ 1000 . . . . . .$659
FX 86E $369
FX 286E $519

SILVER REED

EXP 420P $209
EXP 600P $539
EXP 800P $649

CITIZEN

Premiere 35 . . . . . .$469
MSP-10 . . . . . .$285
MSP-15 . . . . . .$385
MSP-20 . . . . . .$325
MSP-25 . . . . . .$485

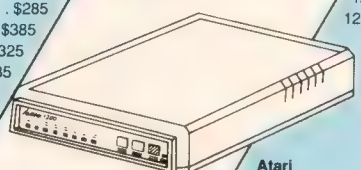
DIABLO

D25 . . . . . .$519
635 . . . . . .$799
D-80 IF $1029

Modems

Avatex
1200 . . . . . .$89
1200hc $119

SPECIAL PRICE



The Avatex 1200hc

Atari
XM-301 . . . . . .$42.95
SX212 . . . . . .$CALL

Hayes
Smartmodem 300 . . . . . .$125
Smartmodem 1200 . . . . . .$369
Smartmodem 1200B $339
Smartmodem 2400 . . . . . $559
Micromodem IIe $125
Smart 300 Apple IIc $149

Commodore
1670 . . . . . $99

Zoom
PC 1200 ST (internal) $189
PC 1200 XL (internal) $259
PC 2400 ST (internal) $329
PC 2400 XL (internal) $349

We stock interfacing for Atari, Commodore, Apple and IBM

"Our Customer Service Department is one example of how much Lyco Computer cares about your satisfaction. Everyday we talk to people from all over the world, and our goal with each person who calls is to be as helpful, efficient, and courteous as possible. We're ready to find the answers -- from questions about the status of an order, to warranties, to product availability and price -- or guide you to someone who can. And we're **always** here to help you. . .before, during, and **after** your purchase."

NOW AVAILABLE

COMMODORE PC 10-1

A complete ready-to-use package of computing power and versatile graphics at an affordable price!

10 -1 -- $749
10 -2 -- $899

- memory and display capabilities to run MS-DOS and any IBM PC-compatible software
- flexible "open architecture" design for easy installation of variety of options, including hard drive
- PC 10-1: 512K RAM (expandable to 640K) and 5-1/4" drive
- PC 10-2: 640K RAM and two 5/1/4" drives
- factory-installed ATI Graphics Solution Adapter eliminates need for installation of special graphics cards

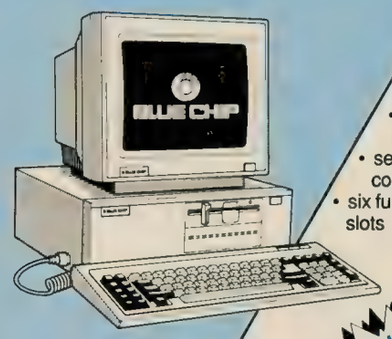
COMMODORE PC 10-2

- serial printer or modem port (RS-232)
- Centronics port for parallel printer
- five full expansion slots
- fan-equipped power supply with reserve capacity for expansion flexibility

FREE WITH PURCHASE OF COMMODORE PC: "Sidekick", the award winning desktop organizer software from Borland.

THE NEW

BLUE CHIP PERSONAL COMPUTER



100% IBM PC/XT compatible -- GUARANTEED, or your money back!

- 512K RAM on the mother board
- serial (RS232C) data communications port
- six full-size expansion slots
- parallel printer port
- 120 watt power supply
- IBM AT-style keyboard
- low profile, step-sculptured, 84 software programmable keys
- one 5/14" 360K B floppy disk drive, capable of second disk drive or hard drive expansion
- high resolution monochromatic video card -- 720 x 348 dots!
- Made by Hyundai. One year warranty on parts and labor.

(call for details)

COMMODORE SOFTWARE

Broderbund:
Bank St. Writer 128K $32.75
Carmen San Diego $22.75
Champ. Lode Runner $24.75
Graphic Library I, II, III . . . $15.75
Karateka $18.75
Print Shop $25.75
Print Shop Companion . . . $22.75
Print Shop Paper $12.75
Science Kit $35.75

Access
Leader Board $24.95
Mach 5 . . . . . $23.95
Mach - 128 . . . . . $29.95
10th Frame $24.95
Executive Tournament . . . $13.95
Tournament #1 . . . . . $13.95
Triple Pack $14.95

Activision:
Aliens $24.75
Champion. Basketball $22.75
Hacker $18.75
Hacker 2 . . . . . $20.75
Labyrinth $22.75
Music Studio $22.75
Portal $26.95
Tass Times $22.75
Titanic . . . . . $New

Microprose:
F-15 Strike Eagle $22.95
Gunship $22.95
Kennedy Approach $19.95
Silent Service $22.95
Solo Flight $19.95
Top Gunner $19.95

Microleague:
Micro League Baseball . . . $24.95
General Manager $24.95
Stat Disk $17.95
'86 Team Disk $14.95
Micro League Wrestling . . . $New

Strategic Simulations:
Gemstone Healer $18.95
Gettysburg $36.95
Kampfgruppe $36.95
Phantasie II $24.95
Ring of Zelfin $24.95
Road War 2000 . . . . . $24.95
Shard of Spring $24.95
Wizards Crown $24.95
War in the S. Pacific $39.95
Wargame Constr. $21.95
Battlecruiser $36.95
Gemstone Warrior $14.95

apple SOFTWARE

Access:
Triple Pack $14.95

Activision:
Enchanter Trilogy $49.75
Game Maker $31.75

Epyx:
Destroyer $24.75
Fastload $24.75
Football $24.75
Karate Champ $19 75
Movie Monster $24.75
Multiplan $24.75
Sub Battle $23.95
Winter Games $23.95
Super Cycle $23.95
Graphics Scrapbook $14 95
St. Sports Basketball $23.95
World's Great Baseball . . $19.95
Summer Games II $24.75
Vorpol Utility Kit $15.75
World Games $24.75

Firebird:
Colossus IV $21.95
Elite $19.95
Frankie Goes to Italy . . . $19.95
Pawn $28.95
Talking Teacher $28.95
Tracker $31.95
Starglider $24.95
Sentry $24.95

Hi Tech Expressions:
Heart Ware $6.75
Holiday Paper $8.95
Card Ware $6.75
Party Ware $9.75

Unison World:
Art Gallery 1 or 2 . . . . . $15.95
Print Master $22.95

Batteries Included:
Paper Clip $26.95
Paper Clip II $44.95
Consultant 64 . . . . . $24.95
Consultant 128 . . . . . $34.95
CalKit $14.95

AMIGA SOFTWARE

Access:
Leader Board $24.95
Tournament #1 . . . . . $14.95

Sublogic:
Baseball Stadium $15.95
Flight Simulator II $31.95
Jet Simulator $31.95
Night Mission Pinball $21.95
Scenery Disk $15.95
Sublogic Baseball $31.95
Sublogic Football $26.95

Epyx:
Destroyer $24.75
Fastload $24.75
Football $24.75
Karate Champ $19 75
Movie Monster $24.75
Multiplan $24.75
Sub Battle $23.95
Winter Games $23.95
World Games $24.95
Wrestling $24.95

Firebird:
Colossus IV Chess $25.95
Elite $22.95
The Pawn $26.95
Starglider $28.95

Unison World:
Art Gallery 2 . . . . . $19.95
Print Master $25.95

Microprose:
Conflict in Vietnam $24.95
Crusade in Europe $24.95
Decision in Desert $24.95
F-15 Strike Eagle $22.95
Silent Service $22.95

Microleague:
Micro Leag. Baseball $25.95
General Manager $25.95
Stat Disk $17.95
'86 Team Disk $14.95

Epyx:
Apshai Trilogy $24.75
Destroyer $24.75
Karate Champ $19.75
Movie Monster $24.75

IBM SOFTWARE

Activision:
Pebble Beach $32.95
Portal $28.95
Champ. Basketball $26.95
Ballyhoo $25.75
Enchanter Trilogy $49.75
Leather Goddesses $25.75
Moonmist $25.75
Music Studio $32.75

Broderbund:
Airheart $22.75
Ancient Art of War $25.75
Print Shop $29.75
Print Shop Companion . . $25.75
Carmen S. Diego (USA) . . $28.75
On Balance $62.75
Bank St. Writer + ... $44.75

Strategic Simulations:
Battlegruppe $38.95
Colonial Conquest $25.95
Gettysburg $35.95
Phantasie II $25.95
Shard of Spring $25.95
Wizards Crown $25.95

Sublogic:
Flight Simulator II $32 95
Jet Simulator $26.95
Night Mission Pinball $22.95
Scenery #1-#6 . . . . . $69.95

Epyx:
Destroyer $24.95
Karate Champ $19.95
Movie Monster $24.95
Winter Games $24.95
World Games $24.95
Wrestling $24.95

Firebird:
Colossus IV Chess $25.95
Elite $22.95
The Pawn $26.95
Starglider $28.95

Unison World:
Art Gallery 2 . . . . . $19.95
Print Master $25.95

Microprose:
Conflict in Vietnam $24.95
Crusade in Europe $24.95
Decision in Desert $24.95
F-15 Strike Eagle $22.95
Silent Service $22.95

Microleague:
Micro Leag. Baseball $25.95
General Manager $25.95
Stat Disk $17.95
'86 Team Disk $14.95

Epyx:
Apshai Trilogy $24.75
Destroyer $24.75
Karate Champ $19.75
Movie Monster $24.75
Leather Goddesses $25.75
Term Paper $35.75
Champ. Basketball $26.95
Championship Golf . . . . . $New

Microprose:
Crusade in Europe $24.95
Decision in Desert $24.95
F-15 Strike Eagle $22.95
Silent Service $22.95

Microleague:
Micro Leag. Baseball $25.95
General Manager $25.95
Stat Disk $17.95
'86 Team Disk $14.95

Broderbund:
Airheart $22.75
Ancient Art of War $25.75
Print Shop $29.75
Print Shop Companion . . $25.75
Carmen S. Diego (USA) . . $28.75
On Balance $62.75
Bank St. Writer + ... $44.75

Strategic Simulations:
Battlegruppe $38.95
Colonial Conquest $25.95
Gettysburg $35.95
Phantasie II $25.95
Shard of Spring $25.95
Wizards Crown $25.95

Sublogic:
Flight Simulator II $32 95
Jet Simulator $26.95
Night Mission Pinball $22.95
Scenery #1-#6 . . . . . $69.95

Epyx:
Destroyer $24.95
Karate Champ $19.95
Movie Monster $24.95
Winter Games $24.95
World Games $24.95
Wrestling $24.95

Firebird:
Colossus IV Chess $25.95
Elite $22.95
The Pawn $26.95
Starglider $28.95

Unison World:
Art Gallery 2 . . . . . $19.95
Print Master $25.95

Microprose:
Conflict in Vietnam $24.95
Crusade in Europe $24.95
Decision in Desert $24.95
F-15 Strike Eagle $22.95
Silent Service $22.95

Microleague:
Micro Leag. Baseball $25.95
General Manager $25.95
Stat Disk $17.95
'86 Team Disk $14.95

Epyx:
Apshai Trilogy $24.75
Destroyer $24.75
Karate Champ $19.75
Movie Monster $24.75
Leather Goddesses $25.75
Term Paper $35.75
Champ. Basketball $26.95
Championship Golf . . . . . $New

Microprose:
Crusade in Europe $24.95
Decision in Desert $24.95
F-15 Strike Eagle $22.95
Silent Service $22.95

Microleague:
Micro Leag. Baseball $25.95
General Manager $25.95
Stat Disk $17.95
'86 Team Disk $14.95

Broderbund:
Airheart $22.75
Ancient Art of War $25.75
Print Shop $29.75
Print Shop Companion . . $25.75
Carmen S. Diego (USA) . . $28.75
On Balance $62.75
Bank St. Writer + ... $44.75

Strategic Simulations:
Battlegruppe $38.95
Colonial Conquest $25.95
Gettysburg $35.95
Phantasie II $25.95
Shard of Spring $25.95
Wizards Crown $25.95

Sublogic:
Flight Simulator II $32 95
Jet Simulator $26.95
Night Mission Pinball $22.95
Scenery #1-#6 . . . . . $69.95

Epyx:
Destroyer $24.95
Karate Champ $19.95
Movie Monster $24.95
Winter Games $24.95
World Games $24.95
Wrestling $24.95

Firebird:
Colossus IV Chess $25.95
Elite $22.95
The Pawn $26.95
Starglider $28.95

Unison World:
Art Gallery 2 . . . . . $19.95
Print Master $25.95

Microprose:
Conflict in Vietnam $24.95
Crusade in Europe $24.95
Decision in Desert $24.95
F-15 Strike Eagle $22.95
Silent Service $22.95

Microleague:
Micro Leag. Baseball $25.95
General Manager $25.95
Stat Disk $17.95
'86 Team Disk $14.95

Epyx:
Apshai Trilogy $24.75
Destroyer $24.75
Karate Champ $19.75
Movie Monster $24.75

Diskettes

5-1/4

Maxell:
SSDD $9.99
DSDD $12.99

Activision:
Borrowed Time $26.95
Champ. Basketball $26.95
Championship Golf $32 95
Hacker $26.95
Hacker 2 . . . . . $29.95
Little People $29.95
Mindshadow $26.95
Music Studio. $35.95
Tass Times $26.95

Strategic Simulations:
Computer Baseball $24.95
Kampfgruppe $34.95

Sublogic:
Flight Simulator II $32.95
Jet Simulator . . . . . $CALL

Epyx:
Apshai Trilogy $22.95
Rogue $22.95
Winter Games $22.95

Firebird:
Pawn $26.95
Starglider $26.95

Unison World:
Print Master $24.95
Art Gallery 1 or 2 . . . . . $18.95

VIP:
VIP Professional $115

Microprose:
Silent Service $24.95

Activision:
Pebble Beach $32.95
Portal $28.95
Champ. Basketball $26.95
Ballyhoo $25.75
Enchanter Trilogy $49.75
Leather Goddesses $25.75
Moonmist $25.75
Music Studio $32.75

Broderbund:
Ancient Art of War $28.95
Print Shop $37.75
Print Shop Companion $31.75
Graphic Library I or II $21.75
Karateka $21.75
Toy Shop $39.95
Bank St. Writer + ... $54.95

Unison World:
Art Gallery 2 . . . . . $18.95
News Master $55.75
Print Master $36.75

Maxell:
SSDD $16.99
DSDD $24.99

SKC:
SSDD $14.99
DSDD $19.99

Activision:
Borrowed Time $26.95
Champ. Basketball $26.95
Championship Golf $32 95
Hacker $26.95
Hacker 2 . . . . . $29.95
Little People $29.95
Mindshadow $26.95
Music Studio. $35.95
Tass Times $26.95

Strategic Simulations:
Computer Baseball $24.95
Kampfgruppe $34.95

Sublogic:
Flight Simulator II $32.95
Jet Simulator . . . . . $CALL

Epyx:
Apshai Trilogy $22.95
Rogue $22.95
Winter Games $22.95

Firebird:
Pawn $26.95
Starglider $26.95

Unison World:
Print Master $24.95
Art Gallery 1 or 2 . . . . . $18.95

VIP:
VIP Professional $115

Microprose:
Silent Service $24.95

Activision:
Pebble Beach $32.95
Portal $28.95
Champ. Basketball $26.95
Ballyhoo $25.75
Enchanter Trilogy $49.75
Leather Goddesses $25.75
Moonmist $25.75
Music Studio $32.75

Broderbund:
Ancient Art of War $28.95
Print Shop $37.75
Print Shop Companion $31.75
Graphic Library I or II $21.75
Karateka $21.75
Toy Shop $39.95
Bank St. Writer + ... $54.95

Unison World:
Art Gallery 2 . . . . . $18.95
News Master $55.75
Print Master $36.75

Maxell:
SSDD $16.99
DSDD $24.99

SKC:
SSDD $14.99
DSDD $19.99

Rogue $19.75
Winter Games $24.75
World Games $24.75

Strategic Simulations:
Road War 2000 . . . . . $24.95
Kampfgruppe $36.95
Shard of Spring $24.95
Battle of Antetiem $38.75
Computer Baseball $14.95
Gettysburg $38.75
Knights in Desert $25.75

Sublogic:
Jet Simulator $32.95
Scenery Japan $15.95
Scenery San Fran. $15.95
Scenery #1-#6 . . . . . $69.95

Broderbund:
Ancient Art of War $28.95
Print Shop $37.75
Print Shop Companion $31.75
Graphic Library I or II $21.75
Karateka $21.75
Toy Shop $39.95
Bank St. Writer + ... $54.95

Unison World:
Art Gallery 2 . . . . . $18.95
News Master $55.75
Print Master $36.75

3.5

3M:
SSDD $16.99
DSDD $23.99

Maxell:
SSDD $15.99
DSDD $21.99

Verbatim:
SSDD $16.99
DSDD $24.99

SKC:
SSDD $14.99
DSDD $19.99

Bonus:
SSDD $6.99
DSDD $7.50

SKC:
SSDD $8.50
DSDD $9.50
DSHD $18.95

Verbatim:
SSDD 9.99
DSDD $12.99

We stock over 5000 titles of software. If it's not listed, call for price and availability!

Cassette Sleeve Maker

David Ito

Make custom cassette sleeves for your music or computer cassette tape collection. For the Commodore 64, 128, Plus/4, or 16 with any printer.

If you're like a lot of people, you've probably accumulated a number of tape copies of your record albums or CDs. Or perhaps you use a Datassette for storage and have built up a large library of program tapes. While a tape can be recorded over and over, the cassette sleeve can be used only once. The result is mislabeled, unlabeled, or sloppy-looking tapes. "Cassette Sleeve Maker" lets you easily create your own cassette sleeves with your computer and printer. The sleeves are just the right size to slide into a standard cassette case.

After typing in the program, be sure to save a copy. The program works as listed on the 128, 64, Plus/4, or 16, and with any printer. When you want to make a sleeve, load and run the program. You'll be asked whether you want to enter information for one or both sides of the tape. For each side, you can enter up to 19 lines of information. Each line can be up to 19 characters long. The first 14 lines will be printed on the part of the sleeve that will show on the front of the cassette case, lines 15–16 will appear on the bottom when the sleeve is folded, and lines 17–19 will appear on the back.

Enter the names of the songs or programs on side A of the tape. Press RETURN after each name, or RETURN alone to enter a blank line. Avoid using the INST/DEL key to delete mistakes; instead use the cursor keys to move back and forth within the line to make corrections. After each line you'll be given a chance to correct any errors—just follow the prompts. If you have fewer than 14 entries for the front of the sleeve, you can enter an up arrow (↑) to skip ahead to the cassette identification field (line 15). You can use lines 15–16 for the name of the artist or group and the album that you recorded on side A. Lines 17–19 can be used for additional song or program names, or to list the artist and album name again.

If you selected the option to enter information for two sides, you'll now repeat the entry process for side B. When you've finished, the program will wait for you to get your printer ready. Press RETURN to print the sleeve. When the printout is complete, simply cut out the sleeve, fold on the dotted lines, and insert it into the cassette case.

See program listing on page 97.

Copies of articles from this publication are now available from the UMI Article Clearinghouse.

For more information about the Clearinghouse, please fill out and mail back the coupon below.

UMI Article Clearinghouse

Yes! I would like to know more about UMI Article Clearinghouse. I am interested in electronic ordering through the following system(s):

☐ DIALOG/Dialorder ☐ ITT Dialcom
☐ OnTyme ☐ OCLC ILL Subsystem

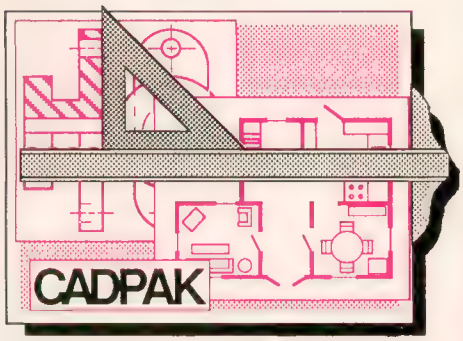
☐ Other (please specify)_____
☐ I am interested in sending my order by mail.
☐ Please send me your current catalog and user instructions for the system(s) I checked above.

Name_____
Title_____
Institution/Company_____
_____
Department_____
Address_____
City_____ State_____ Zip_____
Phone (_____)_____

Mail to: University Microfilms International
300 North Zeeb Road, Box 91 Ann Arbor, MI 48106

Super Software Hits!

Cadpak



Design pictures and graphics quickly and precisely. Unlike other drawing programs, you can produce exact scaled output on your printer. Design in the units of your drawing problem (feet, miles, meters, etc.) and send hardcopy to most printers. Uses either the keyboard or a lightpen. Two separate work screens—transfer artwork from one screen to the other. Place text in four sizes anywhere in the picture—three extra fonts included: Old English, 3-D and Tech. "Try Again" functions allows you to undo a mistake. Solid or dashed lines, circles, ellipses at any angle, rays and boxes. Save and edit fill patterns, fonts and objects. ***Cadpak*** is the full-featured design package for your Commodore computer.

for C-64 $39.95 for C-128 $59.95

Super C

C is one of today's most popular languages. It's easy to transport C source code from one computer to another. With ***Super C*** you can develop software or just learn C on your Commodore. ***Super C*** takes full advantage of this versatile language. Produces 6502 machine code and is many times faster than BASIC. Includes full-screen editor (search, replace and block operations), compiler, linker and handbook. Combine up to seven modules with the linker. Besides the standard I/O library, a graphic library (plot points, draw lines, fill in areas) and a math library (sin, cos, tan, log, arctan, more) are included. Whether you want to learn C, or program in a serious C environment for your Commodore, ***Super C*** is the one to buy.

Super C
Language Compiler
Learn the the language of the 80's and beyond on your '64 and '128

for C-64 $59.95 for C-128 $59.95

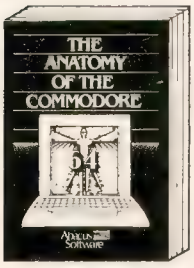
Super Pascal

Your complete system for developing applications in Pascal. A complete implementation of standard Pascal (Jensen and Wirth). C-64 version has a high-speed DOS (3X) for quick and efficient use. The extensive editor (source included) contains added features: append, search and replace. Assembler included to optionally code in machine language. ***Super Pascal*** is so capable that it's used in hundreds of schools to teach Pascal. But it can be used for more than just learning Pascal, use it for serious programming. The graphic library (source included) is written in machine language for fast execution. Want to learn Pascal or develop software using the best tool? ***Super Pascal*** is your first choice.

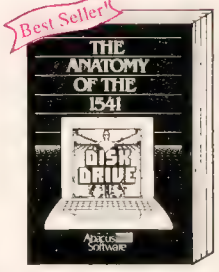
for C-64 $59.95 for C-128 $59.95

Super Pascal
Language Compiler
Expand your programming horizons on your '64 and '128

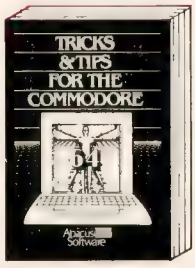
Super Book Hits!



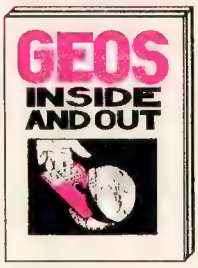
Anatomy of the C-64
Insider's guide to '64 internals. Graphics, sound, I/O, kernal, memory maps, and much more. Complete commented ROM listings. **300pp $19.95**



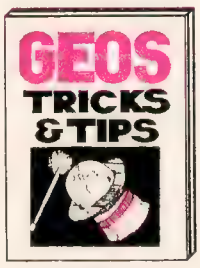
Anatomy of the 1541 Drive
Best handbook on this drive, explains all. Filled with many examples programs, utilities. Fully commented 1541 ROM listings. **500pp $19.95**



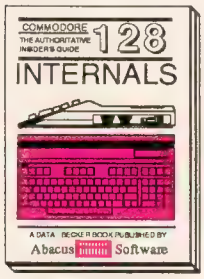
Tricks & Tips for the C-64
Collection of easy-to-use techniques: advanced graphics, improved data input, CP/M, enhanced BASIC, data handling and more. **275pp $19.95**



GEOS Inside and Out
Detailed info on GEOS. Add your own applications to GEOS. Edit icons. Constant display clock. Single-step through memory. **$19.95**



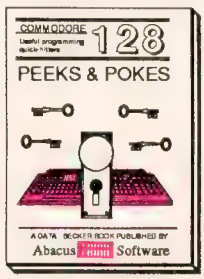
GEOS Tricks and Tips
Collection of helpful techniques for all GEOS users. Includes source for a font editor and a machine language monitor. **$19.95**



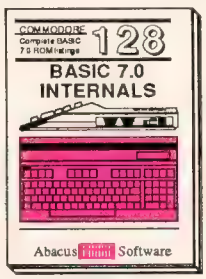
C-128 INTERNALS
Important C-128 information. Covers graphic chips, MMU, I/O, 80 column graphics and fully commented ROM listings, more. 500pp $19.95

1571 INTERNALS
Essential reference. Internal drive functions. Explains various disk and file formats. Fully-commented ROM listings. 450pp $19.95

C-128 TRICKS & TIPS
Fascinating and practical info on the C-128. 80-col hires graphics, bank switching. 300 pages of useful information for everyone. **$19.95**



C-128 PEEKS & POKES
Dozens of programming quick-hitters. techniques on the operating system, stacks, zero page, pointers, and BASIC. 240pp $16.95



C-128 BASIC 7.0 Internals
Get all the inside info on BASIC 7.0. This exhaustive handbook is complete with fully commented BASIC 7.0 ROM listings. **$24.95**

Call now for the name of your nearest dealer. Or order direct with your credit card by calling 616/241-5510. Add $4.00 per order for S&H. Foreign add $12.00 per item.

Other books and software also available. Call or write for your **free catalog.** Dealers inquires welcome—2000 nationwide.

Commodore 64 and Commodore 128 are trademarks of Commodore Ltd.

Abacus
P.O. Box 7219
Dept. G5
Grand Rapids, MI 49510
Telex 709-101 • Fax 616/241-5021
Phone 616/241-5510

SpeedScript 3.2
For The Commodore 64

Charles Brannon

Since its introduction in the January 1984 issue of COMPUTE!'s Gazette, SpeedScript *has been the most popular program ever published by COMPUTE! Publications. Written entirely in machine language,* SpeedScript *contains nearly every command and convenience you'd expect from a quality word processor. The latest version of Commodore 64* SpeedScript, *version 3.2, incorporates many improvements, readers' suggestions, and additional debugging. This version also works on a Commodore 128 in 64 mode.*

SpeedScript 3.2, though compact in size (6K), has many features found on commercial word processors. *SpeedScript* is also very easy to learn and use. You can start writing with it the first time you use it. You type in everything first; preview and make corrections on the screen; insert and delete words, sentences, and paragraphs; and then print out an error-free draft, letting *SpeedScript* take care of things like margins, centering, headers, and footers.

SpeedScript is a writing tool. It won't necessarily make you a better writer, but you may become a better writer once the tedium of retyping and erasing is replaced by the flexibility of a word processor. Words are no longer frozen in place by ink; they become free-floating entities. You no longer think about typewriting—you can stand back and work directly with words and ideas. The distinction between rough and final drafts becomes blurred as you perfect your writing as you write.

Typing In *SpeedScript*

SpeedScript is one of the longest programs we've ever published, but it's well worth typing in. Since *SpeedScript* is a machine language program, it must be entered with the "MLX" machine language entry program found elsewhere in this issue. (If you already have a copy of *SpeedScript 3.0* from the March 1985 issue of COMPUTE! or *SpeedScript 3.1* from the book *SpeedScript: The Word Processor for Commodore 64 and VIC-20*, it's not necessary to retype the entire program. Skip to the section entitled "The *SpeedScript* Family" for simple modifications to update your copy to version 3.2.)

When you run MLX, you'll be prompted for a starting address and an ending address for the data you'll be entering. For *SpeedScript 3.2*, respond with the following values:

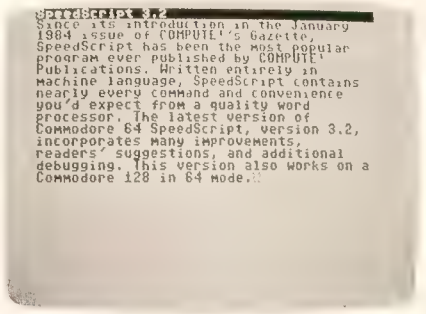
Starting Address: 0801
Ending Address: 2008

When you've finished typing in the data, save several copies to tape or disk before leaving MLX.

Loading *SpeedScript*

SpeedScript can be loaded just as if it were a BASIC program. If you load *SpeedScript* and list it, you'll see that it looks like a one-line BASIC program. This BASIC line is included to make the program easy to load, run, and copy. It's a good idea to save a couple of extra copies of *SpeedScript*, just in case the original is destroyed. To do this, type SAVE"SPEEDSCRIPT3.2",8 (or ,1 if you're using tape) after loading *SpeedScript*, just as you would for a BASIC program. Use whatever filename you like (although "SPEEDSCRIPT" would be the best choice if you intend to use "SpeedScript Date And Time Stamper" found elsewhere in this issue).

Before using *SpeedScript*, you should unplug any cartridges and expanders. *SpeedScript* cannot take advantage of any custom hardware configurations except those that do not interfere with normal operations.


SpeedScript 3.2
Since its introduction in the January 1984 issue of COMPUTE!'s Gazette, SpeedScript has been the most popular program ever published by COMPUTE! Publications. Written entirely in machine language, SpeedScript contains nearly every command and convenience you'd expect from a quality word processor. The latest version of Commodore 64 SpeedScript, version 3.2, incorporates many improvements, readers' suggestions, and additional debugging. This version also works on a Commodore 128 in 64 mode.

SpeedScript 3.2 *is the latest version of COMPUTE! Publications' popular full-featured word processor for the Commodore 64.*

Entering Text

When you run *SpeedScript*, the screen colors change to dark gray on light gray except for the top screen line, which is black with white letters. This *command line* is used to communicate with *SpeedScript*. *SpeedScript* presents all messages here. The remaining lines of the screen are used to enter, edit, and display your document. The *cursor* shows where the next character you type will appear on the screen. *SpeedScript* lets you move the cursor anywhere within your document, making it easy to find and correct errors.

To begin using *SpeedScript*, just start typing. When the cursor reaches the right edge of the screen,

SALE • *Famous National Brand* • SAVE

NLQ 180
Hi-Speed Printer Sale

• 160 - 180 CPS • Near Letter Quality •
Lifetime Warranty*

Price Break Thru

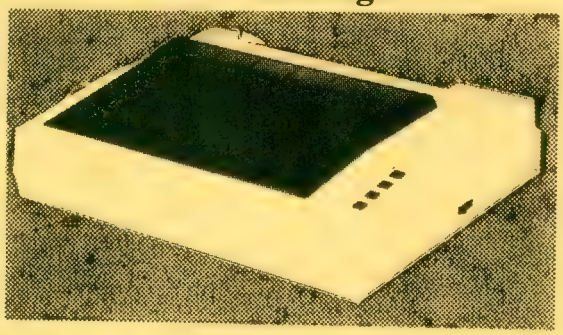
Sale $199.00

Below Wholesale Cost Prices!

List $499.95

60% OFF LIST PRICE

10'' Carriage



All New up Front Panel Controls

NEW

Fantastic Graphics

Easy to Use

Fantastic Price

Sale

NLQ-180 Premium Quality Printer

Near Letter Quality Selectable From Front Panel Controls • High Speed Dot Matrix• Letter Quality Modes • 8K Buffer frees up computer 4-times faster • Pica, Elite, Italics, Condensed • Super Graphics • Business or Personal • Tractor/Friction • 15 Day Free Trial • Lifetime Warranty on Print Head* • 6 Month Immediate Replacement Policy •

NLQ-180 Print Samples

This is an example of ITALICS
Enhanced Boldface
Condensed Text Double-strike
example of Near Letter Quality

APPLE — ATARI — EPSON — NLQ180 SPECIFICATIONS — IBM — COMMODORE — ETC.

Print Buffer
8K bytes utility buffer
Printing Direction
Text Mode — Bi-directional
Graphic Mode — Uni-directional
Interface
Centronics Parallel Port
Paper
Plain paper, Roll paper, Single sheet
Fanfold, Multipart paper: max. 3 sheets (original plus 2 copies)
Character Fonts
Pica, Elite, Italics, Condensed

Printing Method
Impact dot matrix
Printing Speed
160-180 CPS at standard character printing
Printing Characters
Standard 9 x 9 dot matrix
NLQ 12 x 18 dot matrix (33cps)
Character size: 2.12 x 2.8 mm (standard)
Character sets: Full ASCII character set (96)
32 International characters

Ink Ribbon Cartridge
Ribbon Life: 3 million characters/cartridge
Physical Dimensions
Size: 15'' x 12'' x 5''
Weight: 12.7 lbs.
Maximum Number of Characters

Standard:	10 cpi	80 cpl
Standard enlarged:	5 cpi	40 cpl
Elite:	12 cpi	96 cpl
Elite enlarged:	6 cpi	48 cpl
Condensed:	17 cpi	132 cpl
Condensed enlarged:	8.5 cpi	66 cpl
Condensed elite:	20 cpi	160 cpl

INTERFACES

Atari $39.95 Apple $44.95 Commodore $29.95 IBM $49.95 Laser 128 $19.95 Macintosh $49.95

Shipping, Handling & Insurance Charges
Add $10.00 for shipping, handling, and insurance. Illinois residents please add 6½% sales tax. Add $20.00 for ALASKA, CANADA, HAWAII, PUERTO RICO & APO-FPO orders. All orders must be in U.S. Dollars. WE DO NOT EXPORT TO OTHER COUNTRIES EXCEPT CANADA & PUERTO RICO. Enclose cashier check, money order or personal check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail. Prices & Availability subject to change without notice.
VISA — MASTER CARD — C.O.D. Call For C.O.D. Charges.

PROTECTO

We Love Our Customers

22292 N. Pepper Rd., Barrington, Illinois 60010

312/382-5244 to order

PROTECTO
ENTERPRIZES
"The Computer Experts"

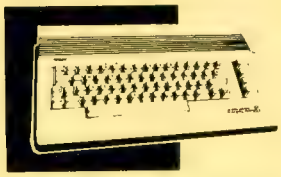
22292 N. Pepper Rd., Barrington IL 60010

• OUR WARRANTY •

Most of our products carry a minimum 90 day warranty from the date of purchase. If problems arise, simply send your product to us via U.P.S. prepaid. We will IMMEDIATELY send you a replacement at no charge via U.P.S. prepaid. This proves once again that...

We Love Our Customers!

COMMODORE 64c

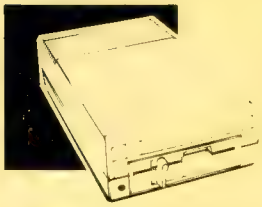


Includes the GEOS program.

SALE $ 159.95

(Add $10.00 shipping) List $299

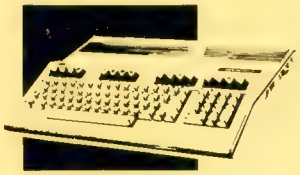
BLUE CHIP DISK DRIVE



SALE $ 159.95

(Add $10.00 shipping)List $249

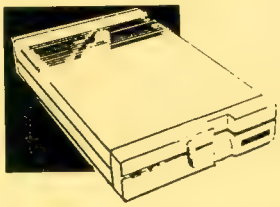
COMMODORE 128



SALE $ 289.00

(Add $10.00 shipping) List $399

1571 DISK DRIVE



SALE $ 259.95

(Add $10.00 shipping) List $349

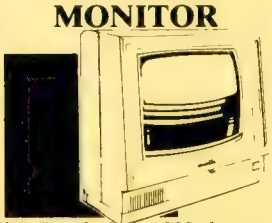
TV TUNER

Now switch your computer monitor into a television set with the flick of a switch.This Tuner has dual UHF/VHF selector switches, mute, automatic fine tuning and computer/TV selector switches. Hooks up between your computer and monitor! Inputs included for 300 ohm, 75 ohm, and UHF.
(Add $3.00 shipping)

SALE $ 79.95

List $130

13'' COLOR MONITOR

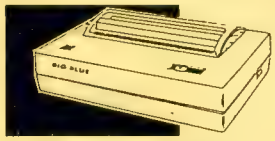


High Resolution, 1000 character display, with built in audio speaker with volume control.
(Add $14.50 shipping)

SALE $ 179.95

List $329

BIG BLUE PRINTER



This is the affordable printer you've waited for! 8½'' letter size, 80 column dot matrix, heat transfer printer features upper and lower case, underline, word processing, and much more.
(Add $7.50 shipping)

SALE $ 39.95

List $199

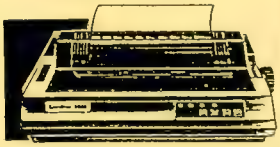
87 EP PRINTER & TYPEWRITER COMBINATION

Superb Silver Reed letter quality daisy wheel printer/typewriter, just a flick of the switch to interchange. Extra large carriage, typewriter keyboard, automatic margin control, compact, lightweight, drop in cassette ribbon! Centronics parallel port.
(Add $12.00 shipping)

SALE $ 179.95

List $299

COMSTAR 1000 PRINTER

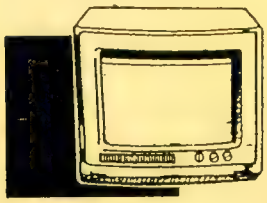


Print letters, documents, etc., at 100 cps. Works in Near Letter Quality mode. Features are dot addressable graphics, adjustable tractor and friction feed, margin settings, pica, elite, condensed, italics, super/subscript, underline, & more. CBM Interface Included.
(Add $10.00 shipping)

SALE $ 179.95

List $349

12'' 80 COLUMN MONITOR

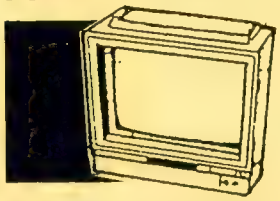


High Resolution amber or green screen monitor. 80 col. x 1000 lines at center. Non-glare screen. Works terrific with IBM, Apple and Laser business computers.
(Add $10.00 shipping)

SALE $ 99.00

List $129

14'' RGB & COMPOSITE COLOR MONITOR



High Resolution, 80 column Monitor. Switch from RGB to Composite. (C128 - IBM -Apple) RGB cable $19.95.)
(Add $14.50 shipping.

SALE $ 237.00

List $399

160-180 CPS N.L.Q. 180 PRINTER

This centronics parallel printer has a Near Letter Quality button on the front panel. No more turning the printer on and off. The 8K buffer will free up your computer four times faster than conventional printers and the high speed will keep you computing more than printing. Super graphics along with Pica, Elite, Italics, and Condensed print. **Lifetime Warranty** on Print Head plus 6 month immediate replacement warranty.
(Add $10.00 shipping)

SALE $ 199.00

List $499

MasterCard

TO ORDER CALL (312) 382-5244

8 am - 8 pm CST Weekdays / 9 am - 12 noon CST Saturdays

VISA

BEST SERVICE IN THE USA • 1 DAY EXPRESS MAIL • OVER 1000 PROGRAMS • VOLUME DISCOUNTS • 15 DAY FREE TRIAL • CUSTOMER LIST OF OVER 3,000,000 - LARGEST IN THE USA

MUSICAL KEYBOARD

This sturdy 40 key professional guage spring loaded keyboard gives the feel and response of a real keyboard instrument. (Conductor software required)

SALE $69.00

List $159.95

1200 BAUD MODEM

Save time and money with this 1200 Baud modem. It has many features you expect a modem to have plus 4 times the speed! For Commodore Computers.

SALE $79.95

List $199

COMPUTER CLEANERS

TV/Monitor Screen Restorer & Cleaning Kit, Disk Drive Cleaner, Anti-Static Keyboard Cleaner

*Choose any of these three computer cleaners for only $9.95 each!

SALE $9.95*

List $19.95

SUPER AUTO DIAL MODEM

300 Baud Modem has on-line clock, dialing from keyboard, capture and display high resolution characters, and more. For Commodore Computers.

SALE $29.95

List $99

DOUBLE SIDED DOUBLE DENSITY DISKS

100% Certified 5¼" floppy disks. **Lifetime Warranty**. 1 Box of 100 $29.00 List $1.99 each

.29¢ ea.

SPECIAL BONUS COUPON

We pack a special software discount coupon with every Computer, Disk Drive, Printer, or Monitor we sell! This coupon allows you to **SAVE OVER $250** off sale prices!

(EXAMPLES)

Name	List	Sale	Coupon
Transformers	$34.95	$22.95	*$21.95*
Trio C128	$69.95	$42.95	*$39.95*
Indoor Sports	$29.95	$19.95	*$18.95*
Championship Basketball	$34.95	$22.95	*$21.95*
Leader Board	$39.95	$23.95	*$21.95*
Tales of Me	$39.95	$16.95	*$14.95*
Monitor Stand	$79.95	$19.95	*$16.95*
Marble Madness	$24.95	$22.95	*$19.95*
Super Bowl Sunday	$35.00	$20.95	*$18.95*
SAT Sample Test	$39.95	$14.95	*$12.95*
Commando	$34.95	$22.95	*$21.95*
Auto Duel	$42.95	$32.95	*$29.95*
Flight Control Joystick	$19.95	$12.95	*$10.00*
Robotics Workshop	$149.00	$119.95	*$114.95*
C64 Troubleshooting & Repair Guide	$19.00	$14.95	*$12.95*

(See over 100 coupon items in our catalog.)

FOR FREE CATALOG CALL (312) 382-5244

CALL BEFORE YOU ORDER: PRICES MAY BE LOWER & WE OFFER SPECIAL SYSTEM DEALS

COMMODORE SOFTWARE

ACCESS

TRIPLE PACK (D)	$19.95
LEADER BOARD (D)	23.95
LEADER BOARD COURSES (D)	13.95
MACH 5 (C)	19.95
MACH 128 (C)	28.95
TENTH FRAME (D)	23.95

ACCOLADE

ACE OF ACES (D)	$18.95
DAM BUSTERS (D)	18.95
FIGHT NIGHT (D)	18.95
HARDBALL (D)	18.95
LAW OF THE WEST (D)	18.95
KILLED UNTIL DEAD (D)	18.95

BLUE CHIP

BARON (D)	$14.95
MILLIONAIRE (D)	14.95
TYCOON (D)	14.95

BCI

TOM WEISKOPF PRO GOLF (D)	$11.95
VIDEO PHILE (D)	14.95
PRINTERS LIB. 1 (D)	8.95
PRINTERS LIB. 2 (D)	8.95
DATABASE MGR./PLUS - C128 (D)	14.95
MIND OVER MATTER (D)	8.95

BRODERBUND

PRINT SHOP (D)	$25.95
GRAPHICS LIB. 1,2 or 3 (D)	15.95
COMPANION (D)	22.95
TOY SHOP (D)	38.95
WHERE IS CARMEN SANDIEGO (D)	21.95
GRAPHICS LIB. HOLIDAY ED. (D)	15.95

ELECTRONIC ARTS

HEART OF AFRICA (D)	$9.95
ONE ON ONE (D)	9.95
PINBALL CONTRUCTION (D)	9.95
MUSIC CONSTRUCTION (D)	9.95
RACING DESTRUCTION (D)	9.95
MARBLE MADNESS (D)	22.95
STAR FLEET 1 (D)	25.95
BALKON RAIDER (D)	22.95
QUIZAM (D)	22.95

DATA SOFT

221 B BAKER STREET (D)	$17.95
MERCENARY (D)	17.95
NEVER ENDING STORY (D)	17.95
MIND PURSUIT (D)	17.95
VIDEO TITLE SHOP (D)	17.95
THEATRE EUROPE (D)	19.95

DESIGNWARE

BODY TRANSPARENT (D)	$24.95
EUROPEAN NATIONS & LOCATIONS (D)	22.95
STATES AND TRAITS (D)	22.95

HAYDEN

SARGON II (D)	$9.95
SAT VERBAL (D)	14.95
SAT MATH (D)	14.95
SAT SAMPLE TEST (D)	14.95

COSMI

SUPER HUEY II (D)	$12.95
TALLADEGA (T)	10.95
BEYOND FORBIDDEN FOREST (D)	10.95

DATA EAST

COMMANDO (D)	$22.95
KARATE CHAMP (D)	22.95
KUNG FU MASTER (D)	22.95

EPYX

CHAMPIONSHIP WRESTLING (D)	$22.95
DESTROYER (D)	22.95
MOVIE MONSTER (D)	22.95
WINTER GAMES (D)	22.95
WORLD GAMES (D)	22.95
WORLD KARATE (D)	16.95
WORLD'S GREATEST FOOTBALL (D)	22.95

HI-TECH EXPRESSIONS

CARD WARE (D)	$9.95
HEART WARE (D)	7.95
PARTY WARE(D)	9.95
WARE WITH ALL KIT (D)	9.95
HOLIDAY PRINT PAPER (D)	7.95

ARTWORK

BEACH BLANKET VOLLEYBALL (D)	$9.95
EQUESTRIAN SHOWJUMPER (D)	9.95
HIGHLAND GAMES (D)	9.95
POLICE CADET (D)	9.95
THAI BOXING (D)	9.95
BRIDGE 4.0 (D)	16.95

SUB—LOGIC

FLIGHT SIMULATOR II (D)	$31.95
JET (D)	25.95
FOOTBALL (D)	25.95
BASEBALL (D)	31.95

S.S.I.

ROADWAR 2000 (D)	$23.95
BATTLE OF ANTIETAM (D)	31.95
GETTYSBURG (D)	32.95
WAR IN SOUTH PACIFIC (D)	32.95
NAM (D)	23.95
U.S.A.A.F. (D)	32.95
KAMPFGRUPPE (D)	32.95
WAR SHIP (D)	32.95

SOFTSYNC

ACCOUNTANT, INC. C128 (D)	$59.95
DESK MANAGER (D)	24.95
KID PRO QUO (D)	19.95
MODEL DIET (D)	19.95
TRIO C64 (D)	29.95

SPINNAKER

DELTA DRAWING (C)	$9.95
NUMBER TUMBLERS (C)	9.95
SEA SPELLER (C)	9.95
UP & ADD'EM (C)	9.95

Shipping, Handling & Insurance Information and Charges

Add $3.00 (unless noted) for shipping, handling, and insurance. Illinois residents please add 6⅓% sales tax. Add $6.00 (double the amount) for CANADA, PUERTO RICO, HAWAII, ALASKA, APO-FPO orders. All orders must be in U.S. Dollars. WE DO NOT EXPORT TO OTHER COUNTRIES EXCEPT CANADA. Enclose Cashier Check, Money Order or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail. Prices & Availability subject to change without notice. Hardware shipping prices vary according to weight. Please call for amount. Monitors can only be shipped to 48 contiguous United States. No APO-FPO for Monitors.

VISA-MASTER CARD-C.O.D. Call for C.O.D. Charges.

it automatically jumps to the beginning of the next line, just as in BASIC. But unlike BASIC, *SpeedScript* never splits words at the right edge of the screen. If a word you're typing won't fit at the end of one line, it's instantly moved to the next line. This feature, called *word-wrap*, makes it much easier to read your text on the screen. Even if you make numerous editing changes, *SpeedScript* reformats the screen and rewraps all words.

Scrolling And Screen Formatting

When you finish typing on the last screen line, *SpeedScript* automatically scrolls the text upward to make room for a new line at the bottom. This is similar to the way BASIC works, but with one exception: The screen can scroll both up *and* down. Imagine the screen as a 24-line window on a long, continuous document.

More than 43K of text space is available in memory, room enough for 20–40 printed pages of text. To check at any time how much space is left, press **CTRL-=** (hold down the CTRL key while pressing the = key). The number which appears on the command line indicates how much room remains for characters of text.

If you're used to a typewriter, you'll have to unlearn some habits. First, since the screen is only 40 columns wide, and most printers have 80-column carriages, it doesn't make sense to press RETURN at the end of each line as you do on a typewriter. *SpeedScript*'s word-wrap takes care of this automatically. Press RETURN only when you want to force a carriage return to end a paragraph or to limit the length of a line. So that you can see these forced carriage returns, they appear on the screen as left-pointing arrows (called *return marks* in this article).

When you print your document, *SpeedScript* automatically formats your text to fit the width of the paper. Don't manually space over for a left margin or try to center a line yourself as you would on a typewriter. *SpeedScript*'s printing routine automatically takes care of all margins and centering and lets you customize the margin settings. Also, don't worry about where a printed page will end. When printing, *SpeedScript* automatically fits your text onto separate pages and can even put short phrases and page numbers at the top or bottom of each page if you want.

Like all good word processors, *SpeedScript* has a wide selection of editing and convenience features. You can move the cursor a single space in either direction, or skip to the next or previous word, sentence, or paragraph. You can also move the cursor to the top of the screen, the top of the document, or the end of the document. The INST/DEL key is used to insert a single space or delete a single character. Other features let you erase a word, sentence, or paragraph, and move or copy sentences, words, and paragraphs to other places in your document. Using Search-and-Replace, you can find any phrase and even automatically change one phrase to another throughout the entire document.

You can save your text on tape or disk, then load it later for additions and corrections. You can transpose (exchange) two characters, change the screen and text colors, send disk commands, read the disk error channel, and automatically tab over five spaces for paragraph indents. You don't need to learn all these commands right away, but you'll be glad they're available as you become more comfortable with word processing.

Using The Keyboard

Most of *SpeedScript*'s features are accessed with control-key commands—you hold down CTRL while pressing another key. In this article, control-key commands are abbreviated **CTRL-*x*** (where *x* is the key you press in combination with CTRL). An example is the **CTRL-=** mentioned above to check on free memory. **CTRL-E** means hold down CTRL and press E. Sometimes you have to hold down both SHIFT and CTRL as you type the command key, as in SHIFT–CTRL-H. Other keys are referenced by name or function, such as back arrow for the left-pointing arrow in the top-left corner of the keyboard, pound sign for the British pound symbol (£), CLR/HOME for the home-cursor key, SHIFT–CLR/HOME for the clear-screen key, f1 for special-function key 1, and up arrow for the upward-pointing arrow to the left of the RESTORE key.

Some keys let you move the cursor to different places in the document to make corrections or scroll text into view. *SpeedScript* uses a unique method of cursor movement that is related to writing, not programming. Programmers work with lines of text and need to move the cursor up and down a line or left and right across a line. *SpeedScript*, however, is oriented for writers. You aren't working with lines of text, but with a continuous document.

Therefore, *SpeedScript* moves the cursor by character, word, sentence, or paragraph. *SpeedScript* defines a word as any sequence of characters preceded or followed by a space. A sentence is any sequence of characters ending with a period, exclamation point, question mark, or return mark. And a paragraph is defined as any sequence of characters ending in a return mark. (Again, a return mark appears on the screen as a left-pointing arrow.)

Here's how to control the cursor:

- The **left/right-cursor key** works as usual; pressing this key by itself moves the cursor right (forward) one space, and pressing it with SHIFT moves the cursor left (backward) one space.
- The **up/down-cursor key** moves the cursor forward to the beginning of the next sentence. Pressing it with SHIFT moves the cursor backward to the beginning of the previous sentence.
- The **f1 function key** moves the cursor forward to the beginning of the next word. The **f2 key** (hold down SHIFT and press f1) moves the cursor backward to the beginning of the previous word.
- The **f3 function key** moves the cursor forward to the beginning of the next sentence (just like the up/down-cursor key). The **f4 key** (hold down SHIFT and press f3) moves the cursor backward to the beginning of the previous sentence (just like pressing SHIFT and the up/down-cursor key).
- The **f5 function key** moves the cursor forward to the beginning of the next paragraph. The **f6 key** (hold down SHIFT and press f5)

Figure 1: *SpeedScript* Keyboard Map

CTRL A	Change case
CTRL B	Change border color
CTRL D	Delete (Sentence, Word, Paragraph)
CTRL E	Erase (Sentence, Word, Paragraph)
CTRL G	Global search and replace
CTRL H	Hunt for phrase with SHIFT: Select hunt phrase
CTRL I	Enter/exit insert mode
CTRL J	Replace with SHIFT: Select replace phrase
CTRL K	Kill buffer
CTRL L	Change text character color
CTRL P	Print
CTRL R	Restore buffer
CTRL V	Verify
CTRL X	Transpose characters
CTRL Z	Go to end of text
CTRL =	Display amount of free memory
CTRL ↑	Send disk command or read error channel
CTRL 4	Display disk directory
CTRL £	Enter format (printer) commands
CTRL 3	Commodore 64 only: Same as CTRL-£
CLR/HOME	Press once to go to top of screen Hold down to go to top of text with SHIFT: Erase all text
CRSR (left/right)	Move the cursor left one character with SHIFT: Move the cursor right one character
CRSR (up/down)	Got to next sentence with SHIFT: Go to previous sentence
RUN/STOP	Indent 5 spaces with SHIFT: Insert 255 spaces
RESTORE	Exit *SpeedScript* (Commodore 64) with RUN/STOP: Exit *SpeedScript* (VIC-20)
	Backspace with CTRL: Delete character under cursor and close up text with SHIFT and CTRL: Delete all spaces from cursor to next character
RETURN	Return mark with SHIFT: End paragraph, add an extra return mark, and indent next paragraph
INST/DEL	Delete character with SHIFT: Insert space

f1	Next Word
f2	Previous Word
f3	Next Sentence
f4	Previous Sentence
f5	Next Paragraph
f6	Previous Paragraph
f7	Load
f8	Save

moves the cursor backward to the beginning of the previous paragraph.

• **CLR/HOME**, pressed once by itself, moves the cursor to the top of the screen without scrolling. Pressed twice, it moves the cursor to the beginning of the document.

• **CTRL-Z** moves the cursor to the bottom of the document.

Correcting Your Typing

One strength of a word processor is that you need never have mistakes in your printed document. Since you've typed everything before you print it, you have plenty of opportunities to proofread and correct your work. The easiest way to correct something is just to type over it, but there are other ways, too.

Sometimes you'll have to insert characters to make a correction. Maybe you accidentally dropped a letter, typing *hngry* instead of *hungry*. When you change the length of a word, you need to push over everything to the right of the word to make room for the insertion. Use **SHIFT-INST/DEL** to open up a single space, just as in BASIC. Merely position the cursor at the point where you want to insert a space, and press SHIFT–INST/DEL.

Insert Modes

It can be tedious to use the SHIFT–INST/DEL key to open up enough space for a whole sentence or paragraph. For convenience, *SpeedScript* has an insert mode that automatically inserts space for each character you type. In this mode, you can't type over characters; everything is inserted at the cursor position. To enter insert mode, press **CTRL-I**. To cancel insert mode, press CTRL-I again. (This kind of command key, one which is used to turn something both on and off, is called a *toggle*). To let you know you're in insert mode, the normally black command line at the top of the screen turns blue.

Insert mode is the easiest way to insert text, but it can become too slow when you're working with a very long document because it must move *all* the text following the cursor position. Although *SpeedScript* uses turbocharged memory-move routines, the 6510 microprocessor can go only so fast. So *SpeedScript* has even more ways to insert blocks of text.

One way is to use the **RUN/STOP** key. It is programmed in *SpeedScript* to act as a five-space margin indent. To end one paragraph and start another, press RETURN twice and press RUN/STOP. Alternatively, you can press **SHIFT-RETURN**, which does this automatically. You can use RUN/STOP to open up more space than SHIFT–INST/DEL. No matter how much space you want to insert, each insertion takes the same amount of time. So the RUN/STOP key can insert five spaces five times faster than pressing SHIFT–INST/DEL five times.

There's an even better way, though. Press **SHIFT-RUN/STOP** to insert 255 spaces. This is enough room for a sentence or two. You can press it several times to open up as much space as you need. And SHIFT–RUN/STOP is *fast*. (You don't want to be in insert mode when you use this trick; that would defeat its purpose.)

Since the INST/DEL key is also slow when you're working with large documents (it, too, must move all text following the cursor), you may prefer to use the back-arrow (←) key to backspace. The **back-arrow** key by itself moves the cursor left one space and blanks out that position. It's more like a backspace than a delete.

After you're finished inserting with these methods, there will probably be some inserted spaces left over that you didn't use. Just press **SHIFT–CTRL–back arrow**. This instantly deletes all extra spaces between the cursor and the start of the following text. SHIFT–CTRL–back arrow is also generally useful whenever you want to delete a bunch of spaces.

Erasing Text

Inserting and retyping are not the only kinds of corrections you'll need to make. Part of writing is separating the wheat from the chaff. On a typewriter, you pull out the paper and throw it away. *SpeedScript* lets you be more selective.

Press the **INST/DEL** key by itself to erase the character to the left of the cursor. All the following text is pulled back to fill the vacant space.

Press **CTRL–back arrow** to delete the character on which the cursor is sitting. Again, all the following text is moved toward the cursor to fill the empty space.

These keys are fine for minor deletions, but it could take a long time to delete a whole paragraph this way. So *SpeedScript* has two commands that can delete an entire word, sentence, or paragraph at a time. **CTRL-E** erases text *after* (to the right of) the cursor position, and **CTRL-D** deletes text *behind* (to the left of) the cursor.

To use the **CTRL-E** (erase) mode, first place the cursor at the beginning of the word, sentence, or paragraph you want to erase. Then press CTRL-E. The command line shows the message *Erase (S,W,P): RETURN to exit.* Press S to erase a sentence, W for a word, or P for a paragraph. Each time you press one of these letters, the text is quickly erased. You can keep pressing S, W, or P until you've erased all the text you wish. Then press RETURN to exit the erase mode.

The **CTRL-D** (delete) mode works similarly, but deletes only one word, sentence, or paragraph at a time. First, place the cursor after the word, sentence, or paragraph you want to delete. Then press CTRL-D. Next, press S, W, or P for sentence, word, or paragraph. The text is immediately deleted and you return to editing. You don't need to press RETURN to exit the CTRL-D mode unless you pressed this key by mistake. *(In general, you can escape from any command in* SpeedScript *by simply pressing RETURN.)* CTRL-D is most convenient when the cursor is already past what you've been typing.

The Text Buffer

When you erase or delete with CTRL-E and CTRL-D, the text isn't lost forever. *SpeedScript* remembers what you've removed by storing deletions in a separate area of memory called a *buffer*. The buffer is a fail-safe device. If you erase too much or change your mind, just press **CTRL-R** to restore the deletion. However, be aware that *SpeedScript* remembers only the last erase or delete you performed.

Another, more powerful use of this buffer is to move or copy sections of text. To move some text from one location in your document to another, first erase or delete it with CTRL-E or CTRL-D. Then move the cursor to where you want the text to appear and press **CTRL-R**. CTRL-R instantly inserts the contents of the buffer at the cursor position. If you want to copy some text from one part of your document to another, just erase or delete it with CTRL-E or CTRL-D, restore it at the original position with CTRL-R, and then move the cursor elsewhere and press CTRL-R to restore it again. You can retrieve the buffer with CTRL-R as many times as you like.

Important: The CTRL-E erase mode lets you erase up to the maximum size of the buffer (12K, or over 12,000 characters). CTRL-E normally removes the previous contents of

S & S Wholesalers, Inc.

WHOLESALE TO THE PUBLIC
BUY BELOW DEALER COST!

1-800-233-6345
ORDERS ONLY

226 Lincoln Road Miami Beach, FL 33139

DISKETTES

Sony DSDD 5¼"	$ 9.97
Memorex DSDD 5¼"	$ 8.97
Precision DSDD 5¼"	$ 7.97
Bonus by Verbatim DSDD 5¼"	$ 6.97
Sony 3½" DSDD	$ 25.50
Sony 3½" SSDD	$ 19.50
Winners 3½" DSDD	$ 24.00

SOFTWARE CLOSEOUTS

Zork I	$ 4.77
Zork II	$ 4.77
Zork III	$ 4.77
File Now	$ 7.77
Calc Now	$ 7.77
Frogger	$ 7.77
Q Bert	$ 7.77
Popeye	$ 7.77
Multiplan	$ 29.77
Triad	$ 4.77
Battlezone	$ 7.77
Robotron	$ 7.77
Rack-Em Up	$ 6.77

ACCESS

Mach 5	$ 22.50
Mach 128	$ 29.90
Leader Board	$ 23.90
Tournament Disk	$ 12.90

MICROPROSE

Acrojet	$ 20.77
F15 Strike Eagle	$ 19.47
Conflict in Vietnam	$ 19.47
Gunship	$ 22.77
Silent Service	$ 24.77

SPRINGBOARD

Certificate Maker	$ 29.90
Newsroom	$ 29.00
Clip Art I	$ 18.90
Clip Art II	$ 22.00

PRINTERS

Okimate 10	$124.77
Okimate 20	$134.77
Plug-N-Print C64	$ 59.77
Plug-N-Print Amiga	$ 69.77
Panasonic 1091	$224.77
Panasonic 1080	$199.77
Star NX 10	$239.77
Star SG10C	$228.77
Okimate 120	$224.77
Epson LX 80	$239.90
Epson FX 85	$369.90
Epson FX 286	$479.90

COMMODORE CLOSEOUTS

VIC 1525 Graphics Printer	$ 99.90
MPS 803 Printer	$109.90
C1600 300 Baud Modem	$ 37.90
Commodore Plus/4	$ 79.90

TIMEWORKS

Partner 128	$ 33.77*
Data Manager 128	$ 38.77
SwiftCalc 128 w/Sideways	$ 38.77
Wordwriter 128 w/Spell Check	$ 38.77
All Four	$149.90
Sylvia Porter's $ Planner 128	$ 42.77
SwiftCalc	$ 27.77
Wordwriter	$ 27.77
Data Manager	$ 27.77
Sylvia Porter's $ Planner	$ 32.77

DIGITAL SOLUTIONS

Pocket Writer 64	$ 23.77
Pocket Writer 128	$ 28.77
Pocket Planner 64	$ 23.77
Pocket Planner 128	$ 28.77
Pocket Filer 64	$ 23.77
Pocket Filer 12	$ 28.77

AMIGA

Call for Pricing
...IN STOCK...

MONITORS

Samsung 14" Color	$139.90
Samsung Green 12"	$ 49.90
80 Col. Cable	$ 8.77
Monitor Cable	$ 5.77
NEC 12" Color	$134.90

JOYSTICKS & ACCESSORIES

WICO The Boss	$ 10.77
WICO Ball	$ 14.77
WKO 3 Way	$ 18.77
Kraft	$ 6.77
5¼" Drive Cleaner	$ 6.77
3½" Drive Cleaner	$ 7.77
CRT Cleaner	$ 14.77
C64 Cover	$ 6.77
C128 Cover	$ 7.77
Drive Cover ST	$ 7.77
Printer Head Cleaner	$ 7.77

CLOSEOUT

Koala Pad By Koala Technologies	$ 39.77

EPYX

Championship Wrestling	$ 23.90
Word Games	$ 23.90
Supper Cycle	$ 23.77
Summer Games	$ 23.90
Summer Games II	$ 23.90
Winter Games	$ 23.90
Fast Load	$ 23.90
Multiplan	$ 39.90
World Karate Champ	$ 17.90
Worlds Greatest Baseball	$ 22.90
Koronis Rift	$ 22.90
Eidolon	$ 22.90

SUBLOGIC

Jet	$ 25.70
Flight Simulator II	$ 31.70
Scenery Disks 1-6	$ 13.70 EA.
Scenery Disk 7-12	$ 13.70 EA.
Scenery Disks 6 Pack	$ 69.70

BATTERIES INCLUDED

Consultant	$ 35.77
Paperclip	$ 35.97
Paperclip w/Spell	$ 47.77

COMMODORE HARDWARE

C128 Computer	$259.90
C1571 Disk Drive	$239.90
MPS 1200 Printer	$249.90
C1902 Monitor	$288.00
C1350 Mouse	$ 37.90
C1660 300 Baud Modem	$ 49.90
C1670 1200 Baud Modem	$148.90
C64 Computer	$139.90
64C Computer	$ CALL

ABACUS

Assembler Monitor	$ 24.99
Basic 128	$ 39.99
Basic 64	$ 24.99
Cadpak 128	$ 39.99
Cadpak 64	$ 27.99
Chartpak 128	$ 27.99
Chartpak 64	$ 24.99
Cobol	$ 27.00
Forth	$ 26.90
Powerplan	$ 26.90
Quick Copy 2.0	$ 14.90
Super C Compiler	$ 39.90
Super Pascal	$ 39.90
T.A.S.	$ 39.90
Video Basic	$ 27.90
XPER	$ 39.90

MASTERTRONIC

Last V8	$ 6.49
5 A Side	$ 6.49
Slugger	$ 6.49
Paul Macartney	$ 6.49
BMX Racer	$ 6.49
Sky Jet	$ 6.49
Line Action Biker	$ 6.49
Skiwriter	$ 11.99
Busicalc 3	$ 11.99
Instant Recall	$ 11.99
• All 3	$ 29.97

ACCOLADE

Ace of Aces	$ 18.90
Dam Busters	$ 17.90
Fight Night	$ 17.90
Hardball	$ 17.90
Law of the West	$ 17.90

BRODERBUND

Karateka	$ 17.00
Printshop	$ 25.90
LIB 1/2/3	$ 14.90
Companion	$ 24.90
Bank St. Writer	$ 32.90

PRECISION

Superbase 64	$ 47.77
Superscript 64	$ 47.77
Superbase 128	$ 52.77
Superscript 128	$ 52.77

*With purchase of any other TIMEWORKS product.

ORDERS ONLY
1-800-233-6345

CUSTOMER SERVICE OR IN FLORIDA (305) 538-1364

FREE FREIGHT ON ALL ORDERS WITHIN CONTINENTAL U.S. OVER $100.00

Orders under $100.00 add $4.00 shipping and handling. C.O.D. orders add $4.00.
Prices reflect a 3% cash discount. A.P.O., F.P.O. orders add 6% shipping & handling. Postal orders shipped surface
Add 6% for air shipment. Add 3% for VISA/MC. Florida residents add 5% sales tax. Personal checks allow 2 weeks for processing
Prices Subject to Change Without Notice

ORDERS RECEIVED BEFORE 12:00 PM WILL BE SHIPPED SAME DAY.

PRO-TECH TRONICS

C-64 COMPUTER

$99

*WITH PURCHASE OF SPECIALLY PRICED SOFTWARE PACKAGE

FACTORY SERVICED FULL WARRANTY

FREE HOME TRIAL

PRO-TECH-TRONICS PRESENTS EMPLOYEE OF THE MONTH

LISA WIESE

CUSTOMER ASSISTANCE MANAGER

QUESTION: What do you enjoy best about your job?

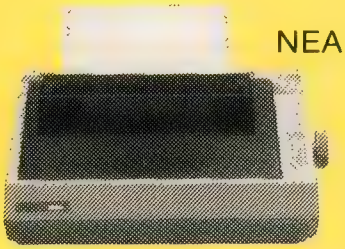
"I really enjoy helping people feel happy and satisfied when they have a problem."

PRINTER

star micronics

10-C

$188



NEAR LETTER QUALITY

- 120 CPS Draft
- 30 CPS NEAR LETTER QUALITY
- Includes Both...
  —TRACTOR FEED
  —FRICTION

COMMODORE READY

CALL TODAY
OPEN 7 DAYS A WEEK & EVENINGS

1-800-345-5080

COMMODORE®

C-128

$199

*WITH PURCHASE OF 1571 DISK DRIVE

FACTORY SERVICED FULL WARRANTY

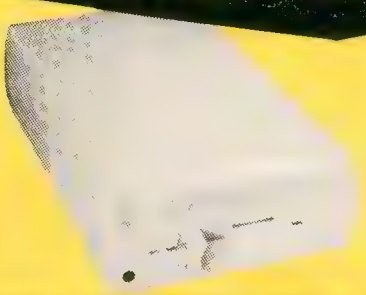
AMIGA

$799

*MONITOR $75 ADDITIONAL

FREE TRIAL PERIOD

DISK DRIVE



1541
COMMODORE

$159

MODEMS

300 BAUD

$28

$119

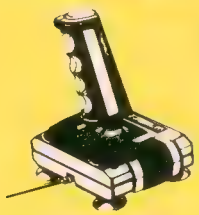
1670
COMMODORE

POWER SUPPLY

C-64

$39

JOY STICKS



$9

DISKETTES

IN PACK OF 100
10 PACKS AVAILABLE

.34¢ ea.

DOUBLE SIDED
DOUBLE DENSITY

QUICK DELIVERY

MasterCard | AMERICAN EXPRESS | VISA | C.O.D. | SCHOOL P.O.'s ACCEPTED

PRO-TECH-TRONICS
6860 Shingle Creek Parkway #201
Minneapolis, MN 55430
Customer Assistance (612) 560-6603
Technical Services (612) 561-3934

COMMODORE®

C-64-C COMPUTER

INCLUDES GEOS

NEW!

C-64-C

$168

*WITH PURCHASE OF DISK DRIVE

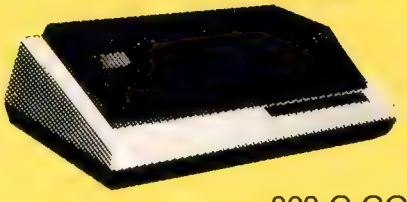
PRINTER

$159

NEAR LETTER QUALITY
- 100 CPS DRAFT
- 20 CPS LETTER QUALITY
- COMMODORE READY

SEIKOSHA

PRINTER

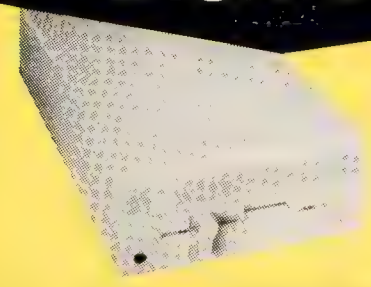


$149

803 C COMMODORE

FREE TRIAL PERIOD

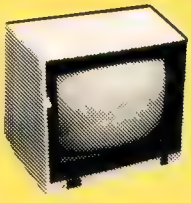
DISK DRIVE



$178

NEW 1541C

MONITOR



$229

FULL COLOR **RGB**

MONOCHROME & COMPOSITE AVAILABLE

CALL TODAY!

PRO-TECH-TRONICS

6860 Shingle Crk. Pkwy. #201
Minneapolis, MN 55430
(612) 560-6603

QUICK-DELIVERY

OPEN 7 DAYS A WEEK & EVENINGS

1-800-345-5080

the buffer each time it is used. Keep this in mind if there's something in the buffer you'd rather keep. If you don't want the current buffer contents to be erased, press **SHIFT-CTRL-E** instead. This preserves the buffer contents and adds newly erased text to the buffer.

Now you can see why CTRL-D lets you delete only a single sentence, word, or paragraph at a time. If it didn't, the deleted text would be added to the end of the buffer, and when you pressed CTRL-R to retrieve the buffer, the deleted text would be out of order (since CTRL-D deletes backward).

If you ever need to erase the contents of the buffer, press **CTRL-K** (remember *kill buffer*).

It's relatively easy to move blocks of text between documents. Using the buffer, you can load one document, erase some text into the buffer, load another document, and then insert the buffer contents into the new document. You can also use the buffer to save an often-used word or phrase, then repeat it whenever you need it.

Starting From Scratch

If you want to start a new document or simply obliterate all your text, press **SHIFT-CLR/HOME**. *SpeedScript* asks, *ERASE ALL TEXT: Are you sure? (Y/N).* This is your last chance. If you *don't* want to erase the entire document, press N or any other key. Press Y to perform the irreversible deed. There is no way to recover text wiped out with Erase All.

The RUN/STOP–RESTORE reset combination on the Commodore 64 has been disabled in *SpeedScript*.

As mentioned above, pressing RUN/STOP by itself inserts five spaces for indenting paragraphs.

Pressing just RESTORE brings up the message *Exit SpeedScript: Are you sure? (Y/N).* If you press Y for yes, you exit to BASIC. (If you press N or any other key at the prompt, you return to editing text with no harm done.) Once in BASIC you'll still have one chance to reenter *SpeedScript* without losing your text—simply enter RUN and your text should be intact when *SpeedScript* is restarted. (Your chances of recovering text decrease if you execute other commands while in BASIC.)

Search-And-Replace

Here's another feature only a computer can bring to writing. *SpeedScript* has a Hunt command that searches through your document to find a selected word or phrase. A Replace option lets you automatically change one word to another throughout the document. Since on the 64, CTRL-S is synonymous with the CLR/HOME key (try it), and since *SpeedScript* already uses CTRL-R, several command keys which are slightly less than mnemonic have been designated for these functions.

SHIFT-CTRL-H activates the Hunt feature, **SHIFT-CTRL-J** (J is used because it's next to the H) lets you selectively hunt and replace, and **CTRL-G** (Global) is for automatically searching and replacing.

Searching for something is a two-step process. First, you need to tell *SpeedScript* what to search for; then you must trigger the actual search. Press SHIFT–CTRL-H. The command line says *Hunt for:*. Type in what you'd like to search for—the *search phrase*—up to 29 characters. *SpeedScript* remembers the search phrase until you change it. (Incidentally, when you are typing on the command line, the only editing key that works is INST/DEL for backing up. *SpeedScript* does not let you enter control codes or cursor controls when you're typing on the command line.) Press RETURN after you've entered the search phrase. If you press RETURN alone without typing anything, the Hunt command is canceled.

When you're ready to search, press **CTRL-H** (without the SHIFT). *SpeedScript* looks for the next occurrence of the search phrase *starting from the current cursor position.* If you want to hunt through the entire document, press CLR/HOME twice to move the cursor to the very top before beginning the search. Each time you press CTRL-H, *SpeedScript* looks for the next occurrence of the search phrase and places the cursor at the start of the phrase. If the search fails (if the search phrase isn't found before the end of the document), you'll see the message *Not Found.*

CTRL-J (Replace) works together with CTRL-H. After you've specified the search phrase with SHIFT–CTRL-H, press SHIFT–CTRL-J to select the replace phrase. *SpeedScript* also remembers this replace phrase until you change it. You can press RETURN alone at the *Replace with:* prompt to select a *null* replace phrase. When you hunt and replace, this deletes the located phrase. To search and replace manually, start by pressing CTRL-H. After *SpeedScript* has found the search phrase, press CTRL-J (without SHIFT) if you want to replace the phrase. If you don't want to replace the phrase, don't press CTRL-J. You are not in a special search-and-replace mode. You're free to continue writing at any time.

CTRL-G links CTRL-H and CTRL-J together. It first asks *Hunt for:*, then *Replace with:*, and then automatically searches and replaces throughout the document starting at the cursor position.

A few hints and cautions: First, realize that if you use *the* as the search phrase, *SpeedScript* dutifully finds the embedded *the* in words like *therefore* and *heathen.* If you changed all occurrences of *the* to *cow*, these words would become *cowrefore* and *heacown.* If you want to find or replace a single word, include a space as the first character of the word, since almost all words are preceded by a space. Naturally, if you are replacing, you need to include the space in the replace phrase, too. Also, *SpeedScript* distinguishes between uppercase and lowercase. The word *Meldids* does not match with *meldids. SpeedScript* will not find a capitalized word unless you capitalize it in the search phrase. To cover all bases, you will sometimes need to make two passes when replacing a word. Keep these things in mind when using CTRL-G since you don't have a chance to stop an out-of-control search-and-replace.

Storing Your Document

Another advantage of word processing is that you can store your writing. A Commodore disk, with 170K of storage space, can store 80–150 pages of text as several document files. Tapes also have great storage capability—but they're slower.

It's easy to store a document. First, make sure your cassette or disk drive is plugged in and functioning. Insert a tape or disk into the drive. Press the **f8** function key (SHIFT-f7). You'll see the prompt *Save:*. Type in a filename for your document. A filename can be up to 16 characters long

and can include almost any characters, but do not use question marks or asterisks. You cannot use the same name for two different documents on a single disk. To replace a document already on disk using the same filename, precede your filename with the characters **@0:** or **@:**. You can also precede the filename with either **0:** or **1:** if you use a dual disk drive. *SpeedScript* cannot access a second disk drive with a device number of 9.

After entering the filename, answer the prompt *Tape or Disk* by pressing either the **T** or **D** key. You can cancel the Save command by pressing RETURN without typing anything else at either the *Save:* or *Tape or Disk* prompt.

After you press T for tape, press RECORD and PLAY simultaneously on the cassette drive. *SpeedScript* begins saving. If you press D for disk, your file is stored relatively quickly (if the disk is formatted and has room). After the Save, *SpeedScript* reports *No errors* if all is well, or reads and reports the disk error message otherwise.

The Commodore 64 is not able to detect errors during a tape Save, so *SpeedScript* provides a verify command. Rewind the tape, press **CTRL-V**, and then type the filename. Press T for tape; press PLAY on the recorder. *SpeedScript* will notify you if there is an error.

Loading A Document

To recall a previously saved document, press the **f7** function key. Answer the *Load:* prompt with the filename. Insert the tape or disk with the file you want to load and press T or D. Press PLAY if you're using tape. *SpeedScript* loads the file and should display *No errors*. Otherwise, *SpeedScript* reads the error channel of the disk drive or reports *Load error* for tape.

It's important to position of the cursor correctly before loading a file. *SpeedScript* starts loading at the cursor position, so be sure to press CLR/HOME twice or SHIFT–CLR/HOME (Erase All) to move the cursor to the start of text space, unless you want to merge two documents. When you press f7 to load, the command line turns green to warn you if the cursor is not at the top of the text space.

To merge two or more files, simply load the first file, press CTRL-Z to move the cursor to the end of the document, and then load the file you want to merge. Do not place the cursor somewhere in the middle of your document before loading. A Load does not insert the characters coming in from tape or disk into your old text, but overwrites all existing text after the cursor position. The last character loaded becomes the new end-of-text marker, and you cannot access any of your old text that may appear after this marker.

Disk Commands

Sometimes you forget the name of a file or need to scratch or rename a file. *SpeedScript* gives you full control over the disk drive. To view the disk directory, press **CTRL-4**. The directory will be displayed on the screen without affecting the text in memory. Press any key to pause scrolling. Afterward, press RETURN to switch back to your text. All the other disk commands are also accessible. Just press **CTRL-↑** (up arrow); then type in a 1541 disk command. You don't need to type PRINT#15 or any quotation marks as you do in BASIC—just the actual command. If you press RETURN without typing a disk command, *SpeedScript* displays the disk status. It also displays the status after completing a disk command. Here is a quick summary of disk commands:

n:*disk name,ID* This formats (NEWs) a disk. You must format a new disk before using it for the first time. The disk name can be up to 16 characters. The ID (identifier) is any two characters. You must use a unique ID for each disk you have. Don't forget that this command erases any existing data on a disk.

s:*filename* Scratches (deletes) a file from the disk.

r:*newname*=*oldname* Changes the name of file *oldname* to *newname*.

c:*backup filename*=*original name* Creates a new file (the backup copy) of an existing file (original copy) on the same disk.

i: Initializes a disk. This resets several disk variables and should be used after you swap disks or when you have trouble reading a disk.

v: Validates a disk. This recomputes the number of available blocks and can sometimes free up disk space. Always use Validate if you notice a filename on the directory flagged with an asterisk. Validate can take awhile to finish.

uj: Resets the disk drive to power-up state.

Additional Features

SpeedScript has a few commands that don't do much, but are still nice to have. **CTRL-X** exchanges the character under the cursor with the character to the right of the cursor. Thus, you can fix transposition errors with a single keystroke. **CTRL-A** changes the character under the cursor from uppercase to lowercase or vice versa. You can hold down CTRL-A to continue changing the following characters.

Press **CTRL-B** to change the background and border colors. Each time you press CTRL-B, one of 16 different background colors appears. Press **CTRL-L** to cycle between one of 16 character (lettering) colors. The colors are preserved until you change them. In fact, if you exit and resave *SpeedScript*, the program will load and run with your color choice in the future.

Printing

If you already think *SpeedScript* has plenty of commands, wait until you see what the printing package offers. *SpeedScript* supports an array of powerful formatting features. It automatically fits your text between left and right margins that you can specify. You can center a line or block it against the right margin. *SpeedScript* skips over the perforation on continuous-form paper, or it can wait for you to insert single-sheet paper. A line of text can be printed at the top of each page (a *header)* and/or at the bottom of each page (a *footer),* and it can include automatic page numbering, starting with whatever number you like.

SpeedScript can print on different lengths and widths of paper, and single-, double-, or triple-spacing (or any spacing, for that matter) is easy. You can print a document up to the size that can be held on a disk or tape by linking several files together during printing. You can print to the screen or to a sequential disk file instead of to a printer. Other features let you print to most printers using most printer interfaces, and send special codes to the printer to control features like

underlining, boldfacing, and double-width type (depending on the printer).

But with all this power comes the need to learn additional commands. Fortunately, *SpeedScript* sets most of these variables to a default state. If you don't change these settings, *SpeedScript* assumes a left margin of 5, a right-margin position of 75, no header or footer, single-spacing, and continuous-paper page feeding. To begin printing, simply press **CTRL-P**. If your printer is attached, powered on, and selected (online), *SpeedScript* begins printing immediately. To cancel printing, hold down the **RUN/STOP** key until printing stops.

Before printing, be sure the paper in your printer is adjusted to top-of-form (move the paper perforation just above the printing element). CTRL-P assumes a Commodore printer, so it's helpful if your interface simulates the modes and codes of the Commodore 1525, 1526, or MPS-801, -802, or -803 printers. CTRL-P prints with a device number of 4 and a secondary address of 7 (uppercase/lowercase mode).

If CTRL-P doesn't work for you, try another variation, **SHIFT-CTRL-P**. Answer the prompt *Print to: Screen, Disk, Printer?* with the single letter **S**, **D**, or **P**. Press any other key to cancel the command.

If you press P for printer, *SpeedScript* requests two more keystrokes. First, answer the *Device number* prompt with a number from 4 through 7. This lets you print to one of several printers addressed with different device numbers. Next, answer the *Secondary address* prompt with a number from 0 through 9.

Non-Commodore Printers

The secondary address is used on most non-Commodore printer interfaces to control special features. For example, you can bypass the emulation features and use graphics mode to communicate directly with your printer (see the true ASCII command below). Consult the list of secondary addresses in your printer interface manual. *SpeedScript* does not work properly with RS-232 serial printers or interfaces.

An additional note: Some printers and interfaces incorporate an automatic skip-over-perforation feature. The printer skips to the next page when it reaches the bottom of a page. Since *SpeedScript* already controls paper feeding, you need to turn off this automatic skip-over-perf feature (usually, by sending out control codes) before running *SpeedScript*, or paging won't work properly. Remember, sometimes the printer controls the skip-over-perf feature, sometimes the interface, and sometimes even both.

The Commodore 64 version of *SpeedScript* has been tested with the following printers: Commodore 1525 and 1526; MPS-801, -802, and -803; C. Itoh Prowriter 8510; Epson MX-80; Gemini 10-X; Star SG-10, SG-10C, and SD-10; Okimate 10 and 20; Okidata 82 and 92; and Hush-80 CD. *SpeedScript* has also been tested with these printer interfaces: Cardco A/B/G+ and G Wiz, Tymac Connection, Xetec, Turbo-Print, and MW-350. *SpeedScript* should work even if your printer or interface is not on this list. These are just the ones that have been tested.

Be sure your printer or interface supplies its own linefeeds. Again, consult your manuals and insure that either your printer or interface (but not both) supplies an automatic linefeed after carriage return. To test this, print a small sample of text with CTRL-P. Since the default is single-spacing, you should not see double-spacing, nor should all printing appear on the same line. If you still aren't getting linefeeds, use the linefeed command discussed below.

Printing To Screen And Disk

SHIFT–CTRL-P prints to the screen when you press S. The screen colors change to white letters on a black background, and what appears on the screen is exactly what would print on the printer. It takes two screen lines to hold one 80-column printed line, of course. If you use double-spacing (see below), it's much easier to see how each line is printed. With this screen preview, you can see where lines and pages break. To freeze printing, hold down either of the SHIFT keys, or engage SHIFT LOCK. The border color changes to white while SHIFT is held down. When printing is finished, press any key to return to editing.

SHIFT–CTRL-P prints to a disk file when you press D. Enter the filename when it's requested. *SpeedScript* sends out all printer information to a sequential file. You can use other programs to process this formatted file. Try this simple example:

```
10 OPEN 1,4
20 OPEN 2,8,8,"filename"
30 GET#2,A$:SS = ST: PRINT#1,A$;: IF
   SS = 0 THEN 30
40 PRINT#1: CLOSE1
50 CLOSE2
```

This program dumps the disk file specified by the filename in line 20 to any printer. You can use it to print *SpeedScript* files (produced with SHIFT–CTRL-P) on another Commodore computer and printer without running *SpeedScript*. Change line 10 to **OPEN 1,2,0, CHR$(6)** to dump the file to a 300-baud modem or RS-232 printer, or **OPEN 1,3** to display it on the screen.

Formatting Commands

The print-formatting commands must be distinguished from normal text, so they appear onscreen in reverse field with the text and background colors switched. You enter these reverse-video letters by pressing **CTRL-£** (pound sign) or **CTRL-3**, which is easier to type with one hand. Answer the prompt *Enter format key:* by pressing a single key. This key is inserted into text in reverse video. All lettered printer commands should be entered in lowercase (unshifted). During printing, *SpeedScript* treats these characters as printing commands.

There are two kinds of printing commands, which will be called stage 1 and stage 2. Stage 1 commands usually control variables such as left margin and right margin. Most are followed by a number, with no space between the command and the number. Stage 1 commands are executed before a line is printed.

Stage 2 commands, like centering and underlining, are executed while the line is being printed. Usually, stage 1 commands must be on a line of their own, although you

can group several stage 1 commands together on a line. Stage 2 commands are by nature embedded within a line of text. A sample stage 1 line could look like this:

l10r50s2

Embedded stage 2 commands look like this:

cThis line is centered.←
This isunderliningu.←

Stage 1 Commands

l Left margin. Follow with a number from 0 to 255. Use 0 for no margin. Defaults to 5. See Figure 2 for an illustration of margin settings.

r Right margin position, a number from 1 to 255. Defaults to 75. Be sure the right-margin value is greater than the left-margin value, or *SpeedScript* will become extremely confused. Some printer interfaces force a certain printing width, usually 80 characters wide. You'll need to disable this in order to permit *SpeedScript* to print lines longer than 80 characters.

t Top margin. The position at which the first line of text is printed, relative to the top of the page. Defaults to 5. The header (if any) is always printed on the first line of the page, before the first line of text.

b Bottom margin. The line at which printing stops before continuing to the next page. Standard 8½ × 11–inch paper has 66 lines on most printers (6 vertical lines of text per inch is standard for Commodore printers). Bottom margin defaults to the fifty-eighth line. The footer (if any) is always printed on the last line of the page, after the last line of text.

p Page length. Defaults to 66. If your printer does not print six lines per inch, multiply lines-per-inch by 11 to get the page length. European paper is usually longer than American paper—11⅝ or 12 inches. Try a page length of 69 or 72.

s Spacing. Defaults to single-spacing. Follow with a number from 1 to 255. Use 1 for single-spacing, 2 for double-spacing, and 3 for triple-spacing.

@ Start numbering *at* page number given. Page numbering normally starts with 1.

? Disables printing until selected page number is reached. For example, a value of 3 would start printing the third page of your document. Normally, *SpeedScript* starts printing with the first page.

x Sets the page width, in columns (think *a cross).* Defaults to 80. You need to change this for the sake of the centering command if you are printing in double-width or condensed type, or if you're using a 40-column or wide-carriage printer.

n Forced paging. Normally, *SpeedScript* prints the footer and moves on to the next page only when it has finished a page, but you can force it to continue to the next page by issuing this command. It requires no numbers.

m Margin release. Disables the left margin for the next printed line. Remember that this executes before the line is printed.

a True ASCII. Every character is assigned a number in the ASCII (American Standard Code for Information Interchange) character set. Most printers use this true ASCII standard, but Commodore printers exchange the values for uppercase and lowercase to match Commodore's own variation of ASCII. Some printer interfaces do not translate Commodore ASCII into true ASCII, so you need to use this command to tell *SpeedScript* to translate. Also, you will sometimes want to disable your interface's emulation mode intentionally in order to control special printer features that would otherwise be rejected by emulation. Place this command as the first character in your document, even before the header and footer definitions. Don't follow it with a number.

Since, in effect, the true ASCII command changes the case of all letters, you can type something in lowercase and use true ASCII to make it come out in uppercase.

w Page wait. Like the true ASCII command, this one should be placed at the beginning of your document before any text. With page wait turned on, *SpeedScript* prompts you to *Insert next sheet, press RETURN* when each page is finished printing. Insert the next sheet, line it up with the printhead, and then press RETURN to continue. Page wait is ignored during disk or screen output.

j Select automatic linefeeds after carriage return. Like **a** and **w**, this command must be placed before any text. Don't use this command to achieve double-spacing, but only if all text prints on the same line.

i Information. This works like REM in BASIC. You follow the command with a line of text, up to 255 characters, ending in a return mark. This line will be ignored during printing; it's handy for making notes to yourself such as the filename of the document.

h Header define and enable. The header must be a single line of text ending with a return mark (up to 254 characters). The header prints on the first line of each page. You can include stage 2 commands such as centering and page numbering in a header. You can use a header by itself without a footer. The header and footer should be defined at the top of your document, before any text. If you want to prevent the header from printing on the first page, put a return mark by itself at the top of your document before the header definition.

f Footer define and enable. The footer must be a single line of text ending in a return mark (up to 254 characters). The footer prints on the last line of each page. As with the header, you can include stage 2 printing commands, and you don't need to set the header to use a footer.

g Go to (link) next file. Put this command as the last line in your document. Follow the command with the letter *D* for disk or *T* for tape, then a colon (:), and finally, the name of the file to print next. After the text in memory is printed, the link command loads the next file into memory. You can continue linking in successive files, but don't include a link in the last file. Before you start printing a linked file, make sure the first of the linked files is in memory. When printing is finished, the last file linked to will be in memory.

Stage 2 Commands

These commands either precede a line of text or are embedded within one.

c Centering. Put this at the beginning of a line you want to center. This will center only one line, ending in a return mark. Repeat this command at the beginning of every

line you want centered. Centering uses the page-width setting (see above) to center the line properly. To center a double-width line, either set the page width to 40 or pad out the rest of the line with an equal number of spaces. If you use double-width, remember that the spaces preceding the centered text will be double-wide spaces.

e Edge right. This command will cause a line to be aligned with the right margin when it is printed. That is, spaces will be inserted in front of the line so that the last character in the line will be printed at the right margin. Place the command at the beginning of the line you want aligned; it will only affect one line at a time, each ending with a return mark. Repeat this command at the beginning of every line you want aligned to the right. Note that this is *not* the same as *right justification*—a feature found on some word processors that adjusts printing to align both the left and right margins—since the edge-right command aligns only one line, and only at the right margin. *SpeedScript* has no right-justification feature.

When *SpeedScript* encounters this command, it prints the current page number. You usually embed this within a header or footer.

u A simple form of underlining. It does not work on Commodore printers, but only on printers that recognize CHR$(8) as a backspace and CHR$(95) as an underline character. Underlining works on spaces, too. Use the first **u** to start underlining and another one to turn off underlining.

Fonts And Styles

Most dot-matrix printers are capable of more than just printing text at ten characters per inch. The Commodore MPS-801 can print in double-width and reverse field. Some printers have several character sets, with italic and foreign language characters. Most can print in double-width (40 characters per line), condensed (132 characters per line), and in either pica or elite. Other features include programmable characters, programmable tab stops, and graphics modes. Many word processors customize themselves to a particular printer, but *SpeedScript* was purposely designed not to be printer-specific. Instead,

Figure 2: Graphic Presentation of Margin Settings

Values shown are default settings

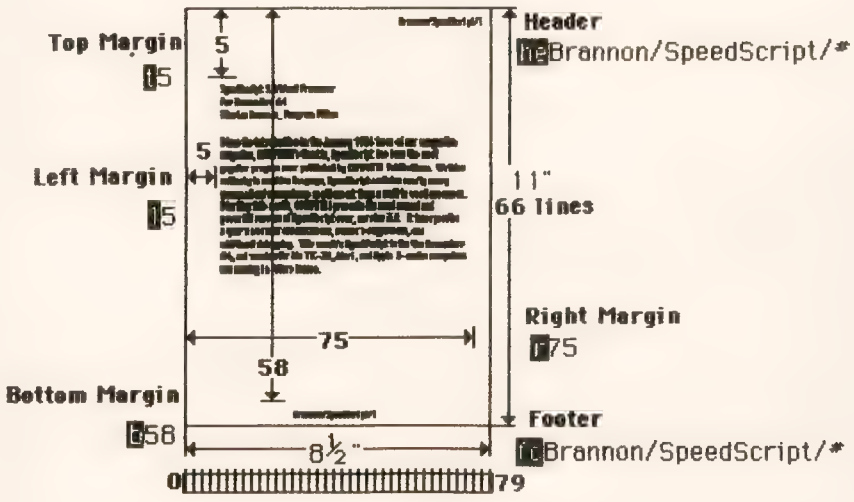


Figure 3: Quick Reference Chart Format (Printer Commands)

Enter these commands with CTRL-£ or CTRL-3:

Command	Description	Default	Command	Description	Default
a	True ASCII	off	n	Next Page	
b	Bottom Margin	58	p	Page Length *	66
c	Centering		r	Right Margin	75
e	Edge Right		s	Spacing	1
f	Footer		t	Top Margin	5
g	Goto Linked File *		u	Underline toggle	
h	Header		w	Page Wait	
i	Information *		x	Columns across *	80
j	Select linefeeds *		@	Initial page # *	1
l	Left Margin	5	?	Skip pages *	
m	Margin Release *		#	Print page number	

hc SpeedScript/#←	Centered Header with page number
l10 r70 s2←	Left margin 10, right margin 70, double spacing.
g0:SpeedScript.2←	Goto and continue printing with filename "SpeedScript.2"

* Notes command changed or added since Version 2.0

SpeedScript lets you define your own stage 2 printing commands.

You define a programmable *printkey* by choosing any character that is not already used for other printer commands. The entire uppercase alphabet is available for printkeys, and you can choose letters that are related to their function (like *D* for double-width). You enter these commands like printer commands, by first pressing **CTRL-3**.

To define a printkey, just press CTRL-3, then the key you want to assign as the printkey, then an equal sign (=), and finally the ASCII value to be substituted for the printkey during printing. For example, to define the + key as the letter *z*, you first look up the ASCII value of the letter *z* (in either your printer manual or user's manual). The ASCII value of the letter *z* is 90, so the definition is **■ = 91←**

Now, anywhere you want to print the letter *z*, substitute the printkey:

Gad■ooks! The ■oo is ■any!←

This will appear on paper as

```
Gadzooks! The zoo is zany!
```

More practically, look up the value of reverse-on and reverse-off. Reverse-on, a value of 18, prints all text in reverse video until canceled by reverse-off (a value of 146) or a carriage return. So, define SHIFT-R as 18 and SHIFT-O as 146. Anywhere you want to print a word in reverse, bracket the word with printkey R and printkey O.

You can similarly define whatever codes your printer uses for features like double-width or emphasized mode. For your convenience, four of the printkeys are predefined, though you can change them. Printkey 1 is defined as a 27, the value of the ESCape code used to precede many two-character printer commands. (With some printer interfaces, you must send two ESCape codes to bypass the interface's emulation.) For example, the Epson command for double strike is ESC-G. You can select it in *SpeedScript* with

■G

Printkey 2, a value of 14, goes into double-width mode on most printers, and printkey 3, a value of 15, turns off double-width on some printers and selects condensed mode on others. Printkey 4 is defined as 18, which selects reverse field with Commodore printers (and on some graphics interfaces in emulation mode) or condensed mode on some other printers.

With so many codes available, you can even design custom logos and symbols using your printer's graphics mode. For example, on the 1525/MPS-801, you can draw a box (perhaps for a checklist) by first setting the appropriate codes:

■=8 ■=25 ■=255 ■=193←

Then display the box with text by typing

13444432Toothpaste←

This appears on paper as

```
□ Toothpaste
```

Keep one thing in mind about printkeys. *SpeedScript* always assumes it is printing to a rather dumb, featureless printer, the least common denominator. *SpeedScript* doesn't understand the intent of a printkey; it just sends its value out. So if you make one word within a line double-width, it may make the line overflow the specified right margin. There's no way for *SpeedScript* to include built-in font and type-style codes without being customized for a particular printer, since no set of codes is universal to all printers.

SpeedScript Mastery

It may take you awhile to fully master *SpeedScript*, but as you do you'll discover many ways to use the editing and formatting commands. For example, there is a simple way to simulate tab stops, say, for a columnar table. Just type a period at every tab-stop position. Erase the line; then restore it multiple times. When you are filling in the table, just use word-left/word-right to jump quickly between the periods. Or you can use the programmable printkeys to embed your printer's own commands for setting and jumping to tab stops.

SpeedScript can also be used as a simple database manager. Type in the information you need; then store it as a *SpeedScript* document. The search feature lets you quickly find information, especially if you use graphics characters to flag key lines. You can search for the graphics characters and quickly skip from field to field.

You don't have to change or define printer commands every time you write. Just save these definitions as a small text file, and load this file each time you write. You can create many custom definition files and have them ready to use on disk. You can create customized "fill in the blank" letters. Just type the letter, and everywhere you'll need to insert something, substitute a graphics symbol. When you're ready to customize the letter, just hunt for each graphics symbol and insert the specific information.

SpeedScript does not work with any 80-column video boards or software 80-column emulators. *SpeedScript* also wipes out most kinds of resident (RAM-loaded) software, including most software-simulated printer drivers. However, you can print to disk using SHIFT–CTRL-P, and then dump the disk file to the printer from BASIC.

File Compatibility

SpeedScript documents are stored as program files (PRG type on disk). Naturally, you can't load and run a *SpeedScript* file from BASIC. The characters are stored in their screen code (POKE) equivalents. Several commercial word processors store text similarly, including *WordPro 3+* and *PaperClip*. As a matter of fact, two commercial spelling checkers designed for *WordPro* also work with *SpeedScript*: *SpellRight Plus* (from Professional Software) and *SpellPro 64* (from Pro-Line Software).

Program 2 is a *SpeedScript* file-conversion utility. It translates *SpeedScript* screen-code program files into either Commodore ASCII or true ASCII. The program works only with disk—not with tape. These translated files are stored in sequential format, the file type used in most file-processing applications. The file converter can also translate a Commodore ASCII sequential file into a screen-code *SpeedScript* program file. You can use the file converter to translate a database into a *SpeedScript* file (or vice versa), and you can convert *SpeedScript* files to true ASCII and use a modem program to upload them to another computer.

The *SpeedScript* Family

SpeedScript premiered in the January 1984 issue of the GAZETTE in the version we now refer to as *SpeedScript 1.0*. A slightly modified version (*1.1*) appeared in *COMPUTE!'s Second Book of Commodore 64*. The next major update, *SpeedScript 2.0*, appeared only on the first GAZETTE Disk, in May 1984. The original version of the currrent update, *SpeedScript 3.0*, was published in COMPUTE! in early 1985 (along with versions for other computers). Although version 3.0 is based on the earlier versions, it is sufficiently different that you cannot "patch" a copy of *SpeedScript 2.0* (or an earlier version) to bring it up to version 3.0. You must type in the entire program.

However, if you have a copy of *SpeedScript 3.0* or *3.1*, you *can* easily upgrade to version 3.2. Simply load, but do not run, your copy of *SpeedScript*; then enter the following POKEs and SAVE the new version with a different name. Be very careful when typing the POKE statements. A mistyped number could introduce a bug that would be difficult to locate.

```
POKE 2547,96:POKE 4316,200:POK
   E 4946,234:POKE 4947,234:PO
   KE 7716,50
POKE 5785,234:POKE 5786,234:PO
   KE 5787,234:POKE 7581,11:PO
   KE 7590,76
POKE 7591,86:POKE 7592,29:POKE
    7593,201:POKE 7594,35:POKE
    7595,208:POKE 7596,23
```

Version 3.2 doesn't add any new features or commands to versions 3.0 or 3.1; only a few minor bugs are corrected.

If you don't wish to type in the listing for *SpeedScript 3.2*, you may order the GAZETTE Disk for this month, which includes all the programs in this issue of COMPUTE!'s Gazette.

See program listings on page 100.

MAJOR... SOFTWARE LIQUIDATION

INVENTORY FROM BANKRUPTCY
—EVERYTHING MUST BE LIQUIDATED

COMMODORE SOFTWARE

Program Name	Description	List	Sale
Flight Simulator	Educational Game	69.95	19.95
Management Combo	Word Processing Spreadsheet	139.95	24.95
Insta-Calc	Spreadsheet	42.95	9.95
Zork II	Game	59.95	9.95
Zork III	Game	59.95	9.95
Dealine	Game	59.95	9.95
Starcross	Game	59.95	9.95
Hes Modem	300 Baud Modem /Software	119.95	19.95
Super Expander 64	21 New Commands	69.95	9.95
Chess	The best in Chess	69.95	9.95
A BEE C'S	Educ. W/Speech	59.95	9.95
Viduzzles	Com. Jigsaw Puzzle	59.95	9.95
Fast Eddie	8 Level Game	39.95	3.99
Turmoil	9 Level Game	39.95	3.99
Snake Byte	20 Play Screen Game	39.95	3.99
Squish 'Em	15 Level Game	39.95	3.99
Mr. Robot	22 Screen Game	39.95	3.99
Kwik-Load	300% Faster Load/Copy	49.95	9.95
Repton	Award Winning	39.95	4.99
Grog Revenge	Caveman Game	39.95	4.99
BC Quest for Tires	Comic Strip BC	39.95	4.99
Matchmake-64	Memory Game	39.95	2.99
Screen Editor	Design your Screens	54.95	9.95
Blueprint	Increase Perl. Cap	54.95	9.95
Games III	7 Great Games	49.95	9.95
Insta Writer	Word Preocessing	69.95	19.95
Designer's Pencil	Draw & Design	59.95	24.95
Decathlon	Competion Game	39.95	14.95
Mind Shadow	Illus. Text Adven.	49.95	12.95
GhostBuster	Musical Game	49 95	9.95
Pitfall II	Avanced Adventure	49 95	14.95
The Music Studio	Compose Music	69.95	29.95
Road Race	Cross Country Race	59 95	19.95

DEALER'S ASK FOR QUANTITY PRICES

WE BUY SOFTWARE

ALL KINDS—Large & Small Quantities! Call & Ask for Art!

A.T.&T. LIQUIDATORS

2640 S. HARBOR BL., SANTA ANA, CA 92704

714-751-2667 MINIMUM ORDER $25

All prices quoted are for cashier's check, money order, or cash. Personal, business checks or credit cards add 5%. California Residents add 6% —Shipping Charges: order—$25.00 to $100.00—7.50 • $101. to $200—15.00 • $200 plus—FREE

LOTTO CIPHER™

GET THE BEST ODDS ON ANY LOTTERY

SIX NUMBER - PICK FOUR - DAILY GAME

- PRODUCES FOUR COMBINATIONS OF NUMBERS TO CHOOSE FROM.
- ANY AMOUNT OF BALLS AND NUMBERS CAN BE PROGRAMMED.
- PRINTS OUT PAST LOTTO NUMBERS DRAWN, PAST COMPUTER PICKS, AND NUMBER DRAW FREQUENCY LIST.
- RANDOM NUMBER GENERATOR INCLUDED.

$29.95 C-64/128

Window Magic

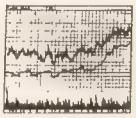
SUPER HI-RESOLUTION DRAWING IN MULTI OR MONO COLOR

- COPY
- FILL
- LINES
- DRAW
- COLOR SQUARES
- MIRROR, FLIP, AND SCROLLING WINDOWS
- ZOOM-EXPANDS A WINDOW TO DOUBLE SIZE
- SAVE AND LOAD YOUR WINDOWS ON DISK
- PRINTS ON STANDARD DOT MATRIX PRINTER
- CLONE COLOR ATTRIBUTES
- TYPES LETTERS AND GRAPHICS
- POLYGON SHAPES-EXPAND, SHRINK AND ROTATE, THEN STAMP ANYWHERE
- ZOOM PLOT-DRAW ON AN EXPANDED WINDOW AND YOUR DRAWING AT THE SAME TIME

$24.95 C-64/128

STOCK BROKER™

PROFITS GUARANTEED OR YOUR MONEY BACK



BUYING GOOD QUALITY, VOLATILE ISSUES AND USING THIS TRADING SYSTEM WILL HAVE YOU FULLY INVESTED AT THE LOWEST PRICES AND CONVERTING TO CASH AS THE STOCK NEARS ITS PEAK.

- TECHNICAL TRADING THAT WORKS.
- BAR GRAPH PRINT-OUTS.
- RECORD UP TO 144 STOCKS ON A DISK.

$29.95 C-64/128

ACORN OF INDIANA, INC.

2721 OHIO STREET
MICHIGAN CITY, IN 46360

219-879-2284

SHIPPING AND HANDLING, ADD $1.50 - C.O.D.'S ACCEPTED
VISA AND MASTER CARD ORDERS ADD 4%
INDIANA RESIDENTS ADD 5% SALES TAX

THE LOWEST PRICES | THE BEST SERVICE

ELECTRONIC ONE®

PHONE LINES OPEN 10-6 E.S.T. M-F

CALL (614) 864-9994 • P.O. Box 13428 • COLUMBUS, OHIO 43213

commodore

HARDWARE

64C 64k COMPUTER	159.99
128C 128k COMPUTER	239.99
1541C DISK DRIVE	179.99
1571C DISK DRIVE	239.99
1802C MONITOR	189.99
1902A RGB MONITOR	279.99
1702 MONITOR	179.99

COMPUTER ACCESSORIES

1351 MOUSE	39.99
128k UPGRADE	99.99
MESSENGER MODEM	34.99
AVATEX 1200 MODEM	79.99
AVATEX 1200HC MODEM	109.99
XETEC JR.	39.99
XETEC SR.	56.99

PRINTERS

STAR NX10	199.99
STAR NX10C	219.99
STAR SG10C	189.99
STAR POWER TYPE	179.99
PANASONIC 1080i	189.99
PANASONIC 1091i	259.99
SEIKOSHA 1000 VC	179.99

SOFTWARE

GEOS	39.99
PRINT SHOP	27.99
BUSINESS FORM SHOP	22.99
NEWSROOM	29.99
MACH 5	22.99
MACH 128	27.99
FAST LOAD	24.99
TURBO LOAD & SAVE	17.99
WORD PRO W/TURBO	22.99
WORD PRO 128 W/FILE	22.99
SPREADSHEET	22.99
FILE PRO 64	18.99
POWER C	22.99
PAPERCLIP W/SPELL	28.99
PAPER W/SPELL	28.99
SUPERBASE 64	49.99
SUPERBASE 128	59.99
POWER ASSEMBLER	29.99
POCKETWRITER 64	27.99
CERTIFICATE MAKER	28.99
DATA MANAGER 128	39.99
WORD MANAGER 128	39.99
SWIFT CALC 128	39.99
SWIFT TAX	33.99
PAPERCLIP II	49.99
COPY II	24.99
TOY SHOP	34.99

SOFTWARE SPECIALS

ACE	9.99
Z PILOT	6.99
COBRA	9.99
KUNG FU FIST	9.99
KUNG FU STICKS	9.99
SARGON II	6.99
SARGON III	22.99
JUKE BOX	2.99
TEMPLE APSHAI TRILOGY	15.99
DESERT FOX	9.99
ZORK TRILOGY	29.99
BLUE MAX	7.99
UP PERISCOPE	22.99
KARATE CHAMP	14.99
KUNG FU MASTER	14.99
COMMANDO	14.99
TOP GUNNER	15.99
THE EIDOLON	7.99
BALL BLAZER	7.99
RESCUE ON FRACTACUS	7.99
KORONIS RIFT	7.99
BARD'S TAIL II	24.99
CHEST MASTER 2000	24.99
F15	19.99
SUBLOGIC FOOTBALL	29.99
SUBLOGIC BASEBALL	27.99

HOW TO ORDER: CASHIER CHECK, MONEY ORDER, MASTERCARD® OR VISA® (ADD 4% FOR CHARGE CARDS) . . . NO PERSONAL CHECKS . . . NO C.O.D.'S . . . SHIPPED U.P.S. . . . ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

SHIPPING: ADD $3.00 ON ALL ORDERS UNDER $100.00 . . . ADD $5.00 ON ALL ORDERS OVER $100.00. ACTUAL FREIGHT CHARGED ON MULTIPLE ORDERS.

INTERNATIONAL: ACTUAL FREIGHT CHARGED ON ALL ORDERS OUTSIDE THE CONTINENTAL UNITED STATES INCLUDING A.P.O.

POLICIES: NO RETURNS WITHOUT A RETURN AUTHORIZATION . . . NO RETURNS UNLESS DEFECTIVE. ALL DEFECTIVES WILL BE EXCHANGED . . . NO EXCEPTIONS. PLEASE SPECIFY . . .

CALL OR WRITE FOR FREE CATALOG

CALL ELECTRONIC ONE (614) 864-9994 OR WRITE

A Guide To Commodore User Groups

Part 1

Caroline Hanlon

This list includes all the Commodore user groups in states beginning with the letters *A–M* (Alabama through Montana) that responded to our mailing. The user groups in the remaining states (Nebraska through Wyoming), APO, and foreign countries will be listed next month in Part 2. When writing to a user group for information, please remember to enclose a stamped, self-addressed envelope.

User groups are listed in each state in zip code order.

If your group does not appear in this list and you wish to be listed, send your club name and address to COMPUTE! Publications, Attn: User Group Update, P.O. Box 5406, Greensboro, NC 27403.

ALABAMA

Valley Commodore Users Group (VCUG), P.O. Box 835, Decatur, AL 35602-0835

Shoals Commodore User Group, 430 Nottingham Rd., Florence, AL 35630

Scottsboro Commodore Users Group, Rt. 5, Box 255, Scottsboro, AL 35768

Huntsville Alabama Commodore Komputer Society (HACKS), P.O. Box 14356, Huntsville, AL 35815

Sequoyah Users Group (SUG), 702 Williams Ave. N., Ft. Payne, AL 35967-2624

Montgomery Area Commodore Komputer Society (MACKS), P.O. Box 210126, Montgomery AL 36121-0126

East Alabama Users' Group, P.O. Box 249, Jacksonville, AL 36265

The Byte Bunch, 318 Perryman St., Evergreen, AL 36401

Commodore Mobile Users Group (CMUG), 3993 Cottage Hill Rd., #78, Mobile, AL 36609

Smiths Alabama Commodore User Group, Rt. 2, Box 105, Smiths, AL 36877

ALASKA

Anchorage Commodore Users, P.O.Box 104615, Anchorage, AK 99510-4615

Mat Su Commodore 64 Club, 3970 Ruth Dr., Wasilla, AK 99687

Sitka Commodore User's Group, P.O. Box 2204, Sitka, AK 99835

First City Users Group, Box 6002, Ketchikan, AK 99901

ARIZONA

Commodore User Group of Arizona, P.O. Box 21291, Phoenix, AZ 85036

Phoenix Arixona Commodore Club, P.O. Box 34905, Phoenix, AZ 85067

Arizona Commodore Users Group, P.O. Box 27201, Tempe, AZ 85282

Gila Hackers, Rt. 1, Box 34, Globe, AZ 85501

Catalina Commodore Computer Club, P.O. Box 32548, Tucson, AZ 85751

Canyon De Chelly-Four Corners Users Group, c/o Calumet Consulting, Box 1945, Chinle, AZ 86503

ARKANSAS

Commodore Computer Club of Pine Bluff, P.O. Box 1083, Pine Bluff, AR 71603

The Southwest Arkansas Commodore Users Group, 404 S. Greening St., Hope, AR 71801

Commodore 64/128 Users Group, P.O. Box 2481, Hot Springs, AR 71914

River City Commodore Club, P.O. Box 4298, N. Little Rock, AR 72116

The Stone 64 Users Group, P.O. Box 301, Reyno, AR 72462

The Personal Touch Commodore User Group of Hoxie and Walnut Ridge, 503 Kaylynn Dr., Walnut Ridge, AR 72476

Harrison Users Group, Rt. 1, Box 15, Harrison, AR 72601

Jintres Hillbilly's C64 User Group, 721 Drennen St., Van Buren, AR 72956

Ark-La-Tex Commodore Users Exchange (CUE), P.O. Box 6473, Texarkana, AR-TX 75505

CALIFORNIA

Hollywood Users Group (HUG) for Commodore Computer Owners, P.O. Box 38313 Hollywood, CA 90038

Cantell Commodore 64/128/CPM Mail Users Group (CMUG), c/o Cantell Computer Services, 3119 Isabel Dr., Los Angeles, CA 90065

South Bay Commodore Users Group (SBCUG) (suburban L.A.), P.O. Box 356, Manhattan Beach, CA 90266

Commodore 64 West Users Club (West L.A. and Santa Monica), P.O. Box 406, Santa Monica, CA 90406-0406

Begabytes C64, 9802 S. Calmada Ave., Whittier, CA 90605

West Orange County Commodore Users Group, P.O. Box 6441, Buena Park, CA 90622

Commodore Helpers of Long Beach, 3736 Myrtle Ave., Long Beach, CA 90807

Pasadena Commodore Computer Club, P.O. Box 1163, Arcadia, CA 91006

Librascope Computer Club, 833 Sonora Ave. MS 807, Glendale, CA 91201

West Valley Commodore Users Group, President, 23455 Justice St., Canoga Park, CA 91304

California Area Commodore Terminal User Society (CACTUS), P.O. Box 1277, Alta Loma, CA 91701

South Bay Commodore Users Group, P.O. Box 1899, Chula Vista, CA 92012-1899

Oceana-64 Commodore User Group, 1004 Plover Way, Oceanside, CA 92056

Back-Country Commodore Club, P.O. Box 373, Ramona, CA 92065

General Dynamics Commodore Computer Club, General Dynamics/ Electronics Division, P.O. Box 85227, MZ7205A, San Diego, CA 92138-5227

San Diego Commodore Users Group, P.O. Box 86531, San Diego, CA 92138

Hi Desert Commodore Users Group, 62026 Sunburst Cr., Joshua Tree, CA 92252

Commodore Users Group of Riverside (CUGR), P.O. Box 8085, Riverside, CA 92515

Power Surge, c/o Orangewood Academy, 13732 Clinton Ave., Garden Grove, CA 92643

Commodore Technical User Group (CTUG), P.O. Box 8342, Orange, CA 92664

64/20 Club, 6464 Shearwater St., Ventura, CA 93003

CIVIC64, P.O. Box 2442, Oxnard, CA 93034-2442

A Bakersfield Area Commodore Users Society (ABACUS), 3101 Oakridge Dr., Bakersfield, CA 93306

San Luis Obispo Commodore Computer Club, P.O. Box 3836, San Luis Obispo, CA 93403-3836

Simply Users of Computers Combining Experience for Strength and Success, 301 Veronica Dr., Paso Robles, CA 93446

Central Coast Commodore Users Group, 4237 Plumeria Ct., Santa Maria, CA 93455

Antelope Valley Commodore User Group (AVCUG), P.O. Box 4436, Lancaster, CA 93539

Madera Users Group (MUG), P.O. Box 783, Madera, CA 93639

PLUG (Plus/4 Users' Group), Box 1001, Monterey, CA 93942

Monterey Peninsula Commodore Group, P.O. Box 2105, Seaside, CA 93955

VISIONS-64, P.O. Box 26638, San Francisco, CA 94126

PET-On-The-Air, 525 Crestlake Dr., San Francisco, CA 94132

Diablo Valley Commodore User Group, P.O. Box 27155, Concord, CA 94527

Fairfield Commodore User's Group, 1758 San Jose Ct., Fairfield, CA 94533

Fremont, Union City, Newark, Hayward Users Group (FUNHUG), 36015 Pizarro Dr., Fremont, CA 94536
Napa Valley Commodore Computer Club, P.O. Box 2324, Napa, CA 94558
North Bay User's Group (NBUG), P.O. Box 7156, Vallejo, CA 94590
San Francisco Commodore Users Group, 2333D 9th Ave., Oakland CA 94606
Marin Commodore Computer Club, 665 Las Colindas Rd., San Rafael, CA 94903
PUG of the Silicon Valley, 22355 Rancho Ventura St., Cupertino, CA 95014
Commodore 64/More User Group, P.O. Box 26811, San Jose, CA 95159-6811
Stockton Commodore User's Group, 1911 Comstock Dr., Stockton, CA 95209
Valley Computer Club, P.O. Box 310, Denair, CA 95316
Santa Rosa Commodore User Group, 333 E. Robles Ave., Santa Rosa, CA 95407-7971
Amateurs and Artesians Computing, P.O. Box 682, c/o Alex KR6G, Cobb Mountain, CA 95426
Computer Users Group of Ukiah (CUGU), 9500 West Rd., Potter Valley, CA 95469
Auburn Commodore Computer Club, P.O. Box 4270, Auburn, CA 95603
Alpha Omega Telecommunications Group, P.O. Box 1339, Citrus Heights, CA 95611-1339
High Sierra Commodore Users Group, P.O. Box 8110, S. Lake Tahoe, CA 95731
North Valley Commodore User's Group, P.O. Box 1925, Chico, CA 95927
Commodore Owners Users Group of Redding (COUGOR), 2776-A Helen St., Redding, CA 96002

COLORADO

Colorado Commodore Computer Club, 11855 Adams St., Northglenn, CO 80233
First United Nocturnal Golden Users' Service (FUNGUS), 1869 West Campus Rd., Golden, CO 80401
North Colorado Commodore Users Group (NORCOCOM), 2138½ 10th St. Rd., Greeley, CO 80631
The Commodore Club, 4058 Baytown Dr., Colorado Springs, CO 80916
The Local Folks Computer Club, 1653-130 Rd., Glenwood Springs, CO 81601

CONNECTICUT

Bristol Commodore Users Group (BCUG), c/o Computech Systems, 178 Pine St., Bristol, CT 06010
Capital Region Commodore Computer Club (CRCCC), P.O. Box 2372, Vernon, CT 06066
Hartford County Commodore Users Group, P.O. Box 8553, East Hartford, CT 06108
Eastern Conn Commodore Users Group, 227 Jagger Ln., Hebron, CT 06248
Millstone Users Group–C64, Sillin Trng. Ctr., Ropeferry Rd., P.O. Box 128, Waterford, CT 06385-0128
Computer Users Group, 6 Saner Rd., Marlborough, CT 06447
Greater New Haven Commodore User Group, P.O. Box 796, North Haven, CT 06473
Commodore Users Group of Stratford, P.O. Box 1213, Stratford, CT 06497
Fairfield County Commodore User Group (FCCUG), P.O. Box 212, Danbury, CT 06813
Stamford Area Commodore Society (SACS), P.O. Box 2122, Stamford, CT 06906-0122

DELAWARE

Newark Computer Users Group (NCUG), 210 Durso Dr., Newark, DE 19711
The Brandywine Users Group (BUG), 157 Starr Rd., Newark, DE 19711
First State Commodore P.O. Box 1313, Dover, DE 19903

DISTRICT OF COLUMBIA

PentAF Commodore User Group, 1947 HSG MWR, Rm. 5E367, AF Rec. Services, Pentagon, Washington, DC 20330
Navy Micro User Group, c/o Clyde Williams, NAVDAC CODE 91, Washington, DC 20374

FLORIDA

Public Domain Users Group, P.O. Box 1442, Orange Park, FL 32067
Welaka Commodore Users Group, P.O. Box 1104, Welaka, FL 32093-1104
Commodore Computer Club, 8438 Lynda Sue Lane W., Jacksonville, FL 32217
Commodore Users Group of Pensacola, P.O. Box 3533, Pensacola, FL 32516
Fort Walton Beach Commodore Users Group, P.O. Box 3, Shalimar, FL 32579
Gainesville Commodore Users Group, Santa Fe Community College, P.O. Drawer 1530, Gainesville, FL 32602
Gainesville Commodore User Group, P.O. Box 14716, Gainesville, FL 32604-4716
Citrus Commodore Computer Club, P.O. Box 503, Beverly Hills, FL 32665
Lake County Educational Users Commodore Club, P.O. Box 326, Tavares, FL 32778
Titusville Commodore Club, 890 Alford St., Titusville, FL 32796
El Shift OH, P.O. 361348, Melbourne, FL 32936-1348
Miami Individuals With Commodore Equipment (MICE), 11110 Bird Rd., Miami, FL 33165
Miami 2064 Commodore Users Group, 11531 S.W. 84 St., Miami, FL 33173
Suncoast Bytes Commodore Computer Club, P.O. Box 721, Elfers, FL 33425
Gold Coast Commodore Group, P.O. Box 375, Deerfield Beach, FL 33441
Commodore Brooksville User Group (C-BUG), P.O. Box 1261, Brooksville, FL 33512
Clearwater Commodore Club, P.O. Box 11211, Clearwater, FL 33516
Bits and Bytes Computer Club, 1859 Neptune Dr., Englewood, FL 33533
R.H.C.C. Users Group 64/128, 8032 Banister Ln., Port Richey, FL 33568
Commodore Users Group of SW Florida, P.O. Box 7692, Ft. Myers, FL 33911
Charlotte County Commodore Club (CCCC), P.O. Box 512103, Punta Gorda, FL 33951-2103

GEORGIA

Metro BBS Society, 1842 Cashmere Ct., Lithonia, GA 30058
Griffin Commodore Program Exchange (GCPE), 1820 Hallmark Dr., Griffin, GA 30223
Stone Mountain Users Group (SMUG 64/128), P.O. Box 1762, Lilburn, GA 30247
C-64 Friendly Users Group, 775 Kings Rd., Athens, GA 30606
Commodore Club of Augusta, P.O. Box 14337, Augusta, GA 30919
Commodore Craze International, 1284 Lynn Dr., Waycross, GA 31501

HAWAII

Makai Commodore User Group (MCUG), P.O. Box 6381, Honolulu, HI 96818
Commodore Hawaii Users Group (CHUG), P.O. Box 23260, Honolulu, HI 96822; or 98-351 Koauka Loop, Apt. 1207, Aiea, HI 96701
Advanced Commodore Users Group, P.O. Box 25273, Honolulu, HI 96825
Commodore Hawaii User's Group (CHUG), 1114 Punahou #8A, Honolulu, HI 96826

IDAHO

PFP 64 Software Exchange, 742 E. 19th, Jerome, ID 83338
Banana Belt Commodore Users Group (BBCUG), P.O. Box 1272, Lewiston, ID 83501
GEM-64, Ken Rosecrans, 407 N. DeClark, Emmett, ID 83617
Commodore Treasure Valley/Boise Users Group (TV/BUG), P.O. Box 6853, Boise, ID 83707

ILLINOIS

PET VIC Commodore Users Group, 892 Knollwood, Buffalo Grove, IL 60089
Fox Valley PET (Commodore) Users Group, 833 Prospect Ave., Elgin, IL 60120
The Software Link, 763 Stewart Ave., Elgin, IL 60120
Computers West, 440 N. Stewart, Lombard, IL 60148
Computer Hackers of Illinois, 6800 Powell, Downers Grove, IL 60516
Chicago B-128 Users Group, 4102 N. Odell, Norridge, IL 60634
Knights of the Round Table, 1724 Pierce Ave., Rockford, IL 61103
Knox Commodore Club, 675 Arnold St., Galesburg, IL 61401
Western Illinois Commodore Users Group (WICUG), 906 W. 6th Ave., Monmouth, IL 61462
Canton Area Commodore Users Group, 13 N. 17th Ave., Canton, IL 61520
PAPUG (Peoria Area PET Users' Group), 800 SW Jefferson St., Peoria, IL 61605
Bloomington-Normal Commodore User Group (BNCUG), P.O. Box 1058, Bloomington, IL 61702-1058
Pros and Newcomers in Commodore (PANIC), c/o DACC, 2000 E. Main St., Danville, IL 61832
Champaign-Urbana Commodore User Group (CUCUG), 802 N Parke St., Tuscola, IL 61935
Meeting 64/128 Users Through the Mail, 51 Thornhill Dr., Danville, IL 61832
East Side Computer Club, P.O. Box 1347, Alton, IL 62002-1347
Western Illinois PET User Group (WIPUG), Rt. 5, Box 75, Quincy, IL 62301
Southern Illinois Commodore-Amiga Club, 1707 E. Main St., Olney, IL 62450
Decatur Commodore Computer Club (DC3), 664 W. Grand, Decatur, IL 62522
Jacksonville Area Commodore Users' Group, P.O. Box 135, Murrayville, IL 62668
Capitol City Commodore Computer Club (5 C's), P.O. Box 2961, Springfield, IL 62708
SPUG Computer Club, P.O. Box 9035, Springfield, IL 62791
Chess Players' Commodore User Group, 723 Barton St., Mt. Vernon, IL 62864
Southern Illinois Commodore User Group, 508 W. Collins, Goreville, IL 62939

INDIANA

Indy Commodore Computer Club (IC3 or ICCC), P.O. Box 11543, Indianapolis, IN 46201
Midwest C-64 Users Group (MW64UG), P.O. Box 9311, Highland, IN 46322
Stueben Commodore Users Group (SCCUG), P.O. Box 25, Pleasant Lake, IN 46779
Fort Wayne Area Commodore Club, P.O. Box 13107, Fort Wayne, IN 46867
Logansport Commodore Club, P.O. Box 1161, Logansport, IN 46947
QS! Alliance (QS/INKY), P.O. Box 1403, New Albany, IN 47150
Richmond Area Commodore Users Group, P.O. Box 1332, Richmond, IN 47375
Bloomington Commodore Users Group (BCUG), 4755 Kinser Pike, Bloomington, IN 47401
Commodore Computer Club, P.O. Box 2332, Evansville, IN 47714
Commodore Owners of Lafayette (COOL), P.O. Box 5763, Lafayette, IN 47903

IOWA

Commodore Users Group, Ames Region (COUGAR), P.O. Box 2302, Ames, IA 50010-2302
Capitol Complex Commodore Computer Club, Box 58, Hartford, IA 50118
Commodore Computer User Group of Iowa, P.O. Box 3140, Des Moines, IA 50316
3C Users Group, R.R. 3, Box 20, Charles City, IA 50616
Product Engineering Center Commodore Users Group (PECCUG), 333 Joy Dr., Waterloo, IA 50701
Syntax Errors Anonymous Commodore User Group, R.R. Box 6894, Spirit Lake, IA 51360
Crawford County Commodore Users Group, 519 N. 19th St., Denison, IA 51442
Iowa City Commodore Users Group (ICCUG), P.O. Box 2412, Iowa City, IA 52244
Washington Area Commodore Users Group, P.O. Box 445, Washington, IA 52353
Penn City User Group, R.R. 1, Box 390, Fort Madison, IA 52627
Quad Cities Commodore Computer Club, P.O. Box 3994, Davenport, IA 52808

KANSAS

Lawrence Commodore User's Group, P.O. Box 2204, Lawrence, KS 66045
TCCUG, P.O. Box 8439, Topeka, KS 66608
Newton Area Commodore Club, 112 Brookside, Newton, KS 67114
65XX Assemblers & Telecommunicators, 617 Lincoln, Sedgwick, KS 67135
Parsons Commodore Computer Users Group, 714 S. 35th St., Parsons, KS 67357
Commodore User's Group of McPherson (CUGOM), 1009 Sycamore Pl., McPherson, KS 67460
Salt City Commodore Club, P.O. Box 2644, Hutchinson, KS 67504
High Plains Commodore Users Group, 1307 Western Plains, Hays, KS 67601

KENTUCKY

Gold City Users Group, P.O. Box 257, Ft. Knox, KY 40121
Commodore Users' Group of Central Kentucky, P.O. Box 55010, Lexington, KY 40555
Purchase C64 User's Group, Rt. 1, Box 209A, Calvert City, KY 42029
Glasgow Commodore User's Group, P.O. Box 154, Glasgow, KY 42141
Logan County Commodore Users Club, P.O. Box 302, Lewisburg, KY 42256
Commodore Users Group of Madisonville (CUGOM), P.O. Box 849, Madisonville, KY 42431

LOUISIANA

New Orleans Commodore Klub, 2308 Houma Blvd., Apt. 724, Metairie, LA 70001
Acadiana Commodore Computer Club (ACCC), P.O. Box 31412, Lafayette, LA 70503
Baton Rouge Area Commodore Enthusiasts (BRACE), P.O. Box 1422, Baton Rouge, LA 70821
Ark-La-Tex Commodore User Group, P.O. Box 6502, Shreveport, LA 71108

MAINE

Your Commodore Users Group, Brunswick Chapter, 103 Main St., Topsham, ME 04086
Your Users Group (YUG), P.O. Box 1924, N. Windham, ME 04062
Compumania, 81 North St., Saco, ME 04072
Southern Maine Commodore, P.O. Box 416, Scarborough, ME 04074-0416
Your Commodore Users Group, 18 Colony Rd., Westbrook, ME 04092
Commodore Users Society of Penobscot (CUSP), c/o 101 Crosby Hall, University of Maine at Orono, Orono, ME 04469
Southern Aroostook Commodore User's Group (SACUG), P.O. Box 451, Houlton, ME 04730

MARYLAND

Federation of Commodore User Societies, (FOCUS DC/MD/VA), P.O. Box 153, Annapolis Junction, MD 20701 *(Note: This is a federation consisting of 15 user groups in the VA/MD/DC area, not a club offering individual memberships.)*
C-64 Users Group FGGM, SeaLandAir Rec. Center, 9810 Emory Rd., Ft. Meade, MD 20755
Rockville Commodore Users Group, P.O. Box 8805, Rockville, MD 20856
Mid-County Commodore Users Group, 18320 Swan Stream Dr., Gaithersburg, MD 20877
Montgomery County Commodore Computer Society, P.O. Box 2689, Silver Spring, MD 20902
VIC Appreciators (VICAP), 10260 New Hampshire Ave., Silver Spring, MD 20903
CUM-BACC, 1427 York Rd. at Seminary Ave., Baltimore, MD 21093-6014
BAYCUG, 110 Danbury Rd., Reisterstown, MD 21136
Baltimore Area Commodore Users Group (BayCUG), 4605 Vogt Ave., Baltimore, MD 21206
Randallstown Commodore User Group, 3702 Durley Ln., Baltimore, MD 21207
C-16 & Plus/4 Users Group, 8202 Edwill Ave., Baltimore, MD 21237
Commodore Users Group, P.O. Box 8756, Baltimore, MD 21240
Westinghouse Commodore Users Group, P.O. Box 8756, Baltimore, MD 21240
The Annapolis Commodore Users Group, P.O. Box 3358, Annapolis, MD 21403
Hagerstown User Group (HUG), 23 Coventry Ln., Hagerstown, MD 21740
Wicomico Commodore Users Group, 204 Holland Ave., Salisbury, MD 21801

MASSACHUSETTS

Pioneer Valley Commodore Club, 6 Laurel Terr., Westfield, MA 01085
Commodore COM-RADES, 35 Hilltop Ave., Jefferson, MA 01522
Eastern Mass Commodore User Group, 6 Flagg Rd., Marlboro, MA 01752
Opportunities Adventure Game Club, 12 Spring Ave., Wakefield, MA 01880
Foxboro Area Commodore Users Group, P.O. Box 322, Foxboro, MA 02035
EM 20/64 User Group, 24 Cottage St., Stoneham, MA 02180
Rockland Area Commodore User's Group, 354 East Water St., Rockland, MA 02370
Commodore Users Group of Cape Cod, P.O. Box 1490, Cotuit, MA 02635
Massachusetts Electronic Modem Operators P.O. Box 3336, Fall River, MA 02722-3336

MICHIGAN

Michigan Commodore Users Group, P.O. Box 539, East Detroit, MI 48021
Computer Operators (COMP), 7514 Puttygut Rd., Richmond, MI 48062
Washtenaw Commodore Users Group, P.O. Box 2050, Ann Arbor, MI 48106-2050
University of Michigan Commodore User Group, School of Public Health, Ann Arbor, MI 48109
Thieves World Users Group, P.O. Box 54, Wayne, MI 48184
Downriver Commodore Group, P.O. Box 1277, Southgate, MI 48195
Soft-Type Users Group, 20231 Westmoreland, Detroit, MI 48219
Northern Genesee County Commodore Users Group (NGCCUG), P.O. Box 250, Clio, MI 48420
The Commodore Kids, 127 Saginaw St., Beaverton, MI 48612
Mid-Michigan Commodore Club, 417 McEwan, Clare, MI 48617
Commodore Computer Club, 4106 Eastman Rd., Midland, MI 48640
Lansing Area Commodore Club, P.O. Box 1065, East Lansing, MI 48823-1065
The Commodore Club, 304 N. Kibbee, St. Johns, MI 48879
United Martial Artists Computer Club (UMACC), 1325 Shaffer Ct., Lansing, MI 48917
Kalamazoo Valley Home Users Group, P.O. Box 3085, Kalamazoo, MI 49003
Battle Creek Commodore and VIC Enthusiasts, 1299 S. 24th, Battle Creek, MI 49015
Van Buren Users' Group (V-BUG), 50984 35½ St., Maple Lake, Paw Paw, MI 49079
DAB Computer Club, P.O. Box 542, Watervliet, MI 49098
Edwardsburg Commodore Users' Group (ECUG), P.O. Box 130, Edwardsburg, MI 49112
Columbia Commodore Computer Club (C⁴), 133 Ernest, Brooklyn, MI 49230

MINNESOTA

Minnesota Commodore Users Association (MCUA), P.O. Box 22638, Robbinsdale, MN 55422
Duluth Commodore Users Group, 1502 Fairview, Cloquet, MN 55720
Hibbing Area Commodore Klub (H.A.C.K.), 1220 E. 14th Ave., Hibbing, MN 55746
Rochester Area Commodore User's Group, 2526 6th Ave. NW, Rochester, MN 55901
Albert Lea Commodore Users Group, 2217 N. Bridge, Albert Lea, MN 56007
Worthington Commodore Computer Society, Rt. 2, Box 261, Worthington, MN 56187
Commodore Users Therapy Group, 1309 N. Gorton Ave., Willmar, MN 56201
Redwood Falls Area Computer Exchange, 717 E. Wyoming St., Redwood Falls, MN 56283
Heartland Area Computer Cooperative, Box 360, Albany, MN 56307
Commodore Bemidji User Group, Rt. 3, Box 392, Bemidji, MN 56601-8313

MISSISSIPPI

Commodore Computer Club, Southern Station, Box 10076, Hattiesburg, MS 39406-0076
Hattiesburg Commodore Computer Club, Dept. of Polymer Science, S.S. Box 10076, Hattiesburg, MS 39406-0076
Commodore Biloxi User Group (ComBUG), 3004-2 Hwy. 90 E., Ocean Springs, MS 39564
Columbus Commodore 64/128 Club, 407 E. Gaywood, Columbus, MS 39702
Software Source, 4550 W. Beach, Biloxi, MS 39531

MISSOURI

Northeast Missouri Commodore Users Group (NEMOCUG), P.O. Box 563, Macon, MO 63552
Heartland Users Group, P.O. Box 443, Cape Girardeau, MO 63701
C.B.U.G., 1925 Treasure Dr., Kennett, MO 63857
Northland Amateur Radio Association, 811 Lindenwood Ln., Liberty, MO 64068
Commodore Users Group of Warrensburg, P.O. Box 893, Warrensburg, MO 64093
Joplin Commodore Computer User Group, 422 S. Florida Ave., Joplin, MO 64801
Mid-Missouri Commodore Club, P.O. Box 7026, Columbia, MO 65205-7026
Commodore User Group of Springfield (CUGOS), Box 607 Jewell Station, Springfield, MO 65801

MONTANA

Cascade County Users Group, P.O. Box 739, Great Falls, MT 59403
Commodore Classic User Group, P.O. Box 3454, Great Falls, MT 59403

WIN THE LOTTO
With Your Computer!

Forget random numbers (use a dartboard for that). This program for most home computers does an actual **analysis** and complete probability **study** of the past winning numbers. This amazing program will quickly provide you with all the data you need to **predict** which numbers will likely come up in subsequent drawings. It's completely **menu driven** so everyone can enjoy using it. Nearly all consistent lottery winners use some kind of **system** based on the past winners. Using the **real** power of your computer gives you a definite **edge**. All you do is add the latest winners each week and the program does the rest in seconds. On screen or printer it shows hot and cold numbers, frequency, groups, patterns, sums-of-digits, odd/even, **wheels numbers** and more. No thick manual to read. It even has a **built-in tutorial.**

ASK YOUR SOFTWARE DEALER OR CALL OR WRITE:

SOFT-BYTE
P.O. Box 556 F. Park
Dayton, Ohio 45405
(513) 233-2200

THE LOTTO PROGRAM is designed for all 6 & 7 digit lotto games (up to 49 numbers) and is sold worldwide!

DON'T PLAY LOTTO WITHOUT IT!

FOR APPLE & M/S DOS COMPATIBLES (IBM) JUST $24.95. ALSO FOR COMMODORE 64/128, RADIO SHACK III, IV & COLOR COMPUTER & ATARI 800/130XE JUST $21.95. FOR MACINTOSH (a super version, Basic Req.) $29.95.

Add $1.50 shipping on all orders. Thank you!

SpeedSearch

Tony St. Clair

This clever utility performs a rapid search through every SpeedScript 3.x *file on a disk to find any word or phrase that you specify.*

If you've forgotten which *SpeedScript* file contains a certain name, phone number, or whatever, "SpeedSearch" can solve your problem. SpeedSearch searches through every *SpeedScript* file on a disk, looking for a key word or phrase that you choose. It eliminates frustrating manual searches of text files.

Typing It In

SpeedSearch should be entered using the "MLX" machine language entry program found elsewhere in this issue. Be sure you understand the instructions for using MLX before you begin entering the data. When you run MLX, you'll be asked for a starting address and an ending address for the data you're entering. For SpeedSearch, respond with the following data:

Starting Address: 0801
Ending Address: 0BB0

When you've finished typing in SpeedSearch, be sure to save a copy on disk.

To use the program, type LOAD"SPEEDSEARCH",8. Then place the disk— containing *SpeedScript* files—that you want searched into the drive and type RUN. You are asked for a search phrase. In response, type in any combination of letters, numerals, and punctuation marks, up to a total of 25 characters. If punctuation marks or spaces are to be included in the search, the entire string should be enclosed in quotation marks. The search is not case-sensitive, so *Cat*, *CAT*, and *cat* would all be found in the sentence *The cat drank too much milk.* Reversed characters are converted to their nonreversed equivalent during the search. The RUN/STOP key can be pressed at any time to halt the program.

Screening For *SpeedScript*

Once you've entered a phrase, SpeedSearch begins searching the disk for *SpeedScript* text files. It uses two criteria for identifying these files. First, it considers only files that are stored as program (PRG) files, bypassing any sequential files. Second, it accepts only files that have a particular load address. As listed, SpeedSearch expects a load address of 9472, the value for documents created by an unmodified version of *SpeedScript 3.0* or higher. Other versions of *SpeedScript* will have a different load address. For example, files created by *SpeedScript 2.0* will have a load address of 10240. Several of the add-on utilities published in GAZETTE and COMPUTE! change the starting address of documents created with the modified versions of *SpeedScript*. For example, documents created using a copy of *SpeedScript* which includes the "Fontmaker" option from the January 1986 issue of COMPUTE! will have a load address of 12544. In these cases, SpeedSearch can be made to recognize these files by POKEing the low byte of the load address into location 2534 and the high byte into location 2542. If you wish to make the changes permanent, be sure to save a copy of the new SpeedSearch after making the changes. There are several utilities available to determine the load address of files stored on disk, including "MetaBASIC" from the February 1987 issue.

Searching The Document

Once a file has been determined to be a *SpeedScript* file, the entire file is scanned for your phrase. As the file is searched, the message SEARCHING...*filename* is printed. After the file has been scanned, a summary is displayed indicating the number of times the desired string was located in that file. This continues until all files have been processed or until the program is stopped. If you put a disk with no *SpeedScript* files in the drive, the message *No SpeedScript files found on this disk* is displayed.

With the information provided by SpeedSearch, you'll be able to choose the correct file every time you use *SpeedScript*.

See program listing on page 99.

SpeedScript Date And Time Stamper

Bob Kodadek

With this utility installed, every file you create with SpeedScript 3.2 *will have a date and time "stamp"—which makes it easy to find the most recent version of a letter or other* SpeedScript *file. A disk drive is required.*

Imagine how valuable it would be to know the origination date of all your *SpeedScript* files. "*SpeedScript* Date And Time Stamper" adds this capability to *SpeedScript* 3.2. Once the program is installed, all *SpeedScript* files are automatically date- and time-stamped. A new *SpeedScript* directory routine displays all the usual information plus the date and time that each file was created. The current date and time is also displayed in full literal form—you'll see May 3, 1987, not 5/3/87.

Typing It In

SpeedScript Date And Time Stamper consists of two programs. Program 1, "*SpeedScript* Date and Time," is written in machine language. It must be entered using the "MLX" machine language editor found elsewhere in this issue. When you run MLX, you'll be asked for the starting and ending addresses of the data you'll be entering. For *SpeedScript* Date And Time, respond with the following values:

Starting address: **C8FB**
Ending address: **CF8A**

After entering the data, save a copy of Program 1 with the filename "SPEEDSCRIPT DATE". Program 2 expects this filename.

Program 2, "Date And Time Loader," is written in BASIC. After typing it in, be sure to save a copy onto the same disk on which you saved Program 1.

To use *SpeedScript* Date And Time Stamper, load and run the BASIC loader (Program 2). It will automatically load SPEEDSCRIPT DATE. You'll then be prompted for the current date and time. The program screens out incorrect data and proceeds to the next prompt only after you've supplied the information in the required format. At this point you'll be asked to insert a disk containing a copy of the *SpeedScript* word processor. This file must be named SPEEDSCRIPT. After you've pressed RETURN, *SpeedScript* is loaded. From now on, the date and time are stamped onto every file you save from within *SpeedScript*. To see the information, press CTRL-4 for the modified directory.

Behind The Stamp

The actual stamping occurs in an unused area in the directory sector of the file and is accomplished by a machine language routine which is sent into the disk drive itself. The stamping operation is immediate, and the entire disk is still available for storage. A stamped disk may still be used normally, since the date and time stamp is transparent to the standard DOS routines.

The new directory is accessed in the normal fashion—by pressing the CTRL-4 key combination. This routine prints the current date and time at the top of the screen followed by the directory information. All of the usual information is displayed in the typical Commodore layout. However, the file type had to be abbreviated in order to accommodate the date and time stamp. The file types are displayed as PG, SQ, UR, and RL, and are self-explanatory. So-called *poison* (or *splat*) and *locked* files are indicated as usual. Also notice that filenames are no longer in quotes. The listing can be paused by pressing the space bar and stopped by pressing RUN/STOP.

The program doesn't alter *SpeedScript*'s other functions in any way. You'll notice after saving a document that the drive light will come back on momentarily. This is the date and time stamp being applied to the directory sector of the file. The utility is disabled when you exit *SpeedScript*. To restart, type SYS 51487.

See program listings on page 98.

ScriptRead

Buck Childress

This versatile utility allows you to read any SpeedScript *file (version 2.x or 3.x) at high speed. Among its features are automatic word-wrapping and word counting. It also has a scratch command to remove unwanted files. A disk drive is required.*

After a while, your *SpeedScript* disks can become overcrowded with files. Even with the most descriptive of filenames, it's hard to remember the contents of every file. "ScriptRead" lets you read through any number of *SpeedScript* files, scratching any that are no longer needed. And since ScriptRead works so fast, it can also help you to locate a particular file—without your having to waste time loading file after file into *SpeedScript*.

Using The Program

ScriptRead is written in BASIC but includes machine language subroutines. Since the program requires exact typing to work properly, be sure to use the "Automatic Proofreader" program located elsewhere in this issue to enter it. Save a copy to disk before attempting to run the program.

To use the program, load it and type RUN. The program asks what you would like to do. Press M to see a menu of your options.

You may change the screen colors for easier viewing by pressing T to change the text color and B to change the background color.

Press D to see the disk directory. Press CTRL to slow the directory listing. Press Q to quit the listing.

To read the contents of a file, press R and then type the name of the file. ScriptRead displays the file on the screen. Since ScriptRead includes an automatic word-wrap function, you'll never have to contend with words that are split between two lines. Press CTRL to slow the listing, any function key to pause it, or Q to quit reading the file. When the end of the file is reached, the number of words in the file is displayed.

Press S to scratch a file. ScriptRead asks for the name of the file to scratch. Type in the name of the file you wish to erase, or press RETURN if you don't wish to erase any files.

If you encounter a disk error (your disk drive light blinks on and off), press E to read the error channel. See your disk drive manual for an explanation of disk errors.

You may press RUN-STOP at the "What would you like to do?" prompt to exit ScriptRead.

See program listing on page 105.

Commodore SERVICE

POWER SUPPLY (C-64) 29.95
1541 (Alignment) 35.00
C-64 (Repair) 44.95
C-128 (Repair) 95.00
1541 (Repair & Alignment) 75.00
1571 (Alignment) 40.00
1571 (Repair & Align) 135.00
POWER SUPPLY (C-128) 99.95
PARTS C-64 & C-128 ..... CALL

PARTS AND DIAGNOSTICS INCLUDED
(**FREE** Return Freight in the USA.
APO-FPO, C3PO add $10)

TO SAVE C.O.D. CHARGES - SEND UNIT & POWER SUPPLY WITH CHECK OR M.O.
(916) 635-3725

Second Source Engineering
2664-B Mercantile Drive
Rancho Cordova,
CA 95670

MONITORS

12" TTL Amber $98.
720 x 350

14" color/green $299.
RGB, TTL
composite input
MAGNAVOX CM8562

composite monitors
CALL!!!

Surge Protected & Noise Filtered Power Center.
(PO01) $55.

300 Baud Modem $29.

1200/300 Baud Modem $139

DATA SETT... DC01 $19.95

P02A $29.95 MODEM & POWER SURGE PROTECTOR

C64, VIC20 POWER SUPPLY
PS01 $29.95

MAXTRON 1825A DURFEE AVE. S. EL MONTE, CA 91733
(818) 350-5707 VISA & MASTERCARD ACCEPTED
Shipping & Handling add on above price DEALERS WELCOMED

computing for families

Computers And Learning: Which Future For You?

Fred D'Ignazio
Associate Editor

I have seen the future, and it is awesome.

Recently I had an opportunity to visit a new *Interactive Learning System* classroom at a local high school. Twenty-five students were sitting at twenty-five microcomputers, looking like bionic kids. They were wearing headphones to hear their computers talk and play the music and sound effects accompanying their lesson. They controlled their computers by talking into a microphone attached to their headphones. All the computers were wired together into a local area network which shared a laser printer and a 20-megabyte hard disk drive. The students seemed totally absorbed in their lesson (which appeared to be an "earth science" unit about the ionosphere). They hunched over their computer keyboards, their eyes locked onto the color display screens.

They reminded me of my son when he watches the Saturday morning cartoons. A firecracker could have exploded beside them and they wouldn't have noticed.

I asked the students' teacher how much such a setup cost.

"Only $145,000," said the teacher proudly. "Ninety-five thousand for the computers, thirty thousand for the proprietary software, and another twenty thousand for the technician who operates and maintains all the equipment."

"Do you really need a paid technician?" I asked. "Can't a teacher be trained to do the same job?"

"No way," said the teacher, shaking his head. "The system is too complicated. You need someone devoted to it full-time. It's like an expensive race car—to keep it on the track you have to fuss with it constantly."

The Good Old Days

While I stood and marvelled at this super-high-tech classroom, I couldn't help remembering the first time I'd taken a computer into a school. It was 1974, and I was a COBOL programmer fleeing from a mindless programming job in the subbasement of the Pentagon. I took my TI Execuport terminal, plugged it into the school telephone, and introduced elementary-school kids to computers by teaching them to program simple games in BASIC.

I kept 27 third graders spellbound for over an hour with a remote terminal the size of a sewing machine and a book of computer games.

Of course I wasn't trying to teach high-school kids about earth science. I just wanted to turn kids on to computers.

Scratching Your Head

When my first COMPUTE! column appeared in April 1982, it began with a cartoon of a funny-looking little man kneeling on the floor surrounded by all kinds of computer parts. The man was soldering some parts together and looking like he was having a great time.

That little man was me.

He was also the thousands of other computer hobbyists who first got into personal computers because of the way they were so *unformed*—like Lego blocks which you had to assemble yourself.

As I looked at the students in the high-tech learning lab, I realized how far we have come since those early days in personal computers. It made me realize we are on the verge of entering a new era in which microcomputers officially become an "appliance"—like a car, microwave oven, or TV set. All the complexities, all the frustrating details of making a computer run will no longer matter. If something breaks down, we'll take the computer to the repair shop and have it serviced. The teacher is spared the nuisance of having to install, maintain, and service her classroom computers. She'll turn the whole mess over to a trained expert.

"It's about time!" you say. And you may be right; perhaps it's a good thing. After all, teachers don't have time to fuss and fume over cables, adapters, circuit cards, disks, and other computer paraphernalia.

But what about the students? When we tame technology and cover up all those messy wires and glitches, are we enriching or impoverishing our students' learning? If all technology becomes as transparent or invisible as a car's carburetor or a refrigerator's electric motor, how can a student ever learn about technology?

Let's look at the bottom line for a moment. How does a learning lab compare with a *pencil*? Which is the more versatile tool? Which is more creative, more open-ended? Which is more personal? Which tool gives a student more control over the *process* of learning rather than limited goals and objectives?

Which is cheaper?

And what happens if the learning lab's technician can't come in to work?

simple answers to common questions

Tom R. Halfhill, Staff Editor

Each month, COMPUTE!'s Gazette tackles some questions commonly asked by Commodore users. If you have a question you'd like to see answered here, send it to this column, c/o COMPUTE!'s Gazette, P.O. Box 5406, Greensboro, NC 27403.

Q. I plan to buy a modem. Do I need things like QuantumLink to make it work? Also, do I have to pay extra phone charges when I use the modem? If I upgrade my system to a Commodore 128, will I need a different modem in 128 mode than in 64 mode? If so, are there any modems that work in both 128 and 64 mode?

A. The word *modem* stands for *modulator/demodulator.* Simply put, it's a device which connects a computer to a standard telephone line. It allows a computer to transmit information to another modem-equipped computer by converting the data into audio tones which are carried by the phone line. At the other end, the tones are converted back into the original data by the other modem.

You don't pay extra phone charges when using a modem because as far as the phone company is concerned, you're making an ordinary phone call. If you call another computer long-distance, you pay the long-distance rates that you would if you placed a voice call to the same city at the same time of day. (There's one exception, which we'll explain in a moment.)

The only thing you need to make a modem work—besides a telephone line and the appropriate terminal software running on your computer—is another modem-equipped computer to call. The other computer and modem can be next door or on the other side of the world.

QuantumLink is a commercial information service that specializes in Commodore computers. An information service is like a large, electronic bulletin board that offers a number of services, including a library of public domain programs; public messages; private electronic mail; and online conferencing (something like a national "party line" in which dozens of people can participate in a conversation by typing on their keyboards). Other popular information services which cater to owners of many different kinds of computers are CompuServe, The Source, Delphi, GEnie, and PeopleLink.

You can also use a modem to call any of the hundreds of bulletin board systems (BBSs) spread throughout the world. Unlike the commercial information services, which are operated on large mainframes or minicomputers, BBSs are typically run on a single personal computer by a hobbyist. They offer similar services, but on a smaller scale. Check your local user group for a list of popular BBSs.

Extra charges are usually assessed only when you call a commercial information service with your modem. Most services have hourly rates ranging from $3 to $15. (An exception is QuantumLink, which charges a flat fee of $9.95 per month and $3.60 per hour for certain services.) The bigger information services have local phone numbers in most major metropolitan areas, so you don't have to place a long-distance call to reach them. If you live outside these areas, you can link up through a special long-distance network that costs a few dollars an hour.

All modems that work with the Commodore 64 are also compatible with the Commodore 128, so you won't need to buy a new modem if you upgrade. The same modem works in either 64 or 128 mode, as well as in CP/M mode.

Q. I've noticed there are programs on the Atari 130XE that allow the extra 64K to be used as a RAM disk. Is there a way of doing this on the Commodore 128 in 64 mode? This could be a really useful capability. I can also imagine that using part of a memory expansion module to set up a number of RAM disk drives in 64, 128, or CP/M mode would be nice to do.

A. Setting up a RAM disk on the Atari 130XE is a little easier in one sense because it's not a multimode computer. In addition to its regular 64K, the 130XE has four extra 16K banks which are available at any time. The Commodore 128, on the other hand, is really three computers in one: a 128, a Commodore 64, and a CP/M machine. The 128K of memory available in 128 mode is not "visible" to the computer in 64 mode. This was a necessary design compromise to insure full 64 compatibility.

You could set up a RAM disk using the 64K of memory available in 64 mode—in fact, this has already been done on the Commodore 64—but the RAM disk would have to be relatively small to leave room for your program. To overcome this limitation, Commodore has introduced a 256K memory expander for the 64. (For more on this product, see the feature on data storage elsewhere in this issue.) This $129 module plugs into the user port and comes with software to set up two different kinds of RAM disks. One RAM disk is for normal 64 applications, and the other is for use with *GEOS (Graphics Environment Operating System).* Since *GEOS* frequently accesses the disk drive, the RAM disk's very high speed (about 1000 times faster than that of a floppy) makes *GEOS* much easier to use.

Memory expanders for the 128 can also be used as RAM disks, but not in all three of the computer's modes.

BASIC for beginners

The Power Of The ON Command

Larry Cotton

BASIC has a very useful command that can be used in conjunction with GOTO and GOSUB. That command is ON.

If you've been writing simple BASIC programs incorporating the statements we've discussed in this column, you may have encountered situations where you need to test for several conditions and take appropriate actions. Take a look at the following example:

```
100 INPUT "NUMBER FROM 1 TO 3"; A
110 IF A=1 THEN GOSUB 500
120 IF A=2 THEN GOSUB 600
130 IF A=3 THEN GOSUB 700
```

We've seen both INPUT and IF/THEN before. Lines 500, 600, and 700 would contain the subroutines which would perform different actions depending on the value typed for A—1, 2, or 3. Here's a way to accomplish the same thing in only two lines:

```
100 INPUT "NUMBER FROM 1 TO 3"; A
110 ON A GOSUB 500, 600, 700
```

That's all there is to it. Again, lines 500, 600, and 700 would contain the subroutines corresponding to the values of A.

How does ON work? First, look at the line numbers following the GOSUB; they are in positions one, two, and three. The number of positions usually correlates with the highest value of A that we expect the user to type. In this case, we're asking for a 1, 2, or 3. Therefore, there are three corresponding line numbers following the GOSUB.

If the user types a 1, ON uses that value to choose which number to go to—in this case line 500. Similarly, if the user types a 2 or a 3, control of the program is sent to line 600 or 700, respectively.

ON with GOTO

GOTO as well as GOSUB can be used with ON. Type in and RUN this program:

```
100 INPUT "NUMBER FROM TWO TO
    FIVE"; A
110 ON A GOTO 100, 120, 130, 140, 150
120 PRINT "TWO": END
130 PRINT "THREE": END
140 PRINT "FOUR": END
150 PRINT "FIVE": END
```

You're expected to enter a number in the range 2–5. Program control will be transferred to lines 120–150, which are in positions 2–5 after the GOTO. Try entering values in this range and observe the results.

Next, type in some values outside the requested range, including 1 and negative values. The table shows what happens for each possible number, and why.

No. typed	Program response	Why?
negative	ILLEGAL QUANTITY	ON cannot handle negative numbers (but see below)
0	Prints TWO	ON statement is ignored when zero is typed in
1	Asks again	Control is sent to line number in the first position after GOTO—line 100
2–5	Prints TWO—FIVE	Control is sent to the line numbers in the second through fifth positions after GOTO— lines 120 through 150
6–255	Prints TWO	ON statement is ignored when values exceed the number of entries after GOTO
256	ILLEGAL QUANTITY	Maximum value ON can handle is 255 or more

Here is a summary of the guidelines for using ON:

- Line numbers must be separated by commas (spaces optional).
- Any legal numeric expression may follow ON. Examples: X, N+3, X(3), GR*2−1.
- All the rules for GOTO and GOSUB (see last month) apply when they are used with ON.
- If the destination line for the GOTO or GOSUB doesn't exist, you'll get the error message UNDEF'D STATEMENT ERROR IN *line number*.
- The number of lines to which program control may be transferred usually corresponds to the highest value that the expression may become.
- If the expression evaluates to zero or a value greater than the number of positions after the GOTO or GOSUB, the ON is ignored.
- The maximum number of positions after GOTO or GOSUB is 255, but you can't actually type 255 different line numbers because of the 80-character limit of a Commodore 64 BASIC line or the 160-character limit of Commodore 128 BASIC.
- If negative numbers or numbers greater than 255 are used with ON, you'll get the error message ILLEGAL QUANTITY.
- If the numeric expression following ON is not an integer, the decimal portion is dropped. For instance, in the example programs above, if the user types 3.25 at the prompt, it will be treated as 3.

ON with Negative Numbers

Suppose you want ON to handle negative input. An example might be:

```
100 INPUT "ENTER A NUMBER FROM
    −3 TO −1"; N
110 ON N+4 GOTO 120, 130, 140
120 PRINT "MINUS THREE": END
130 PRINT "MINUS TWO": END
140 PRINT "MINUS ONE": END
```

Here's a chance to really use the old gray matter. ON has the capability of doing some simple (or even very complicated) math before it decides to which line number it should transfer control. In the above example, 4 is added to the number that is input (which should be in the range −3 to −1). This brings the input number into the range 1 to 3—a range that ON can handle.

Here's what happens: If you

type a −3 at the prompt, N becomes −3 and N+4 becomes +1 (−3+4=+1). +1 causes control to be sent to line 120, which prints the message "MINUS THREE".

Similarly, if you type a −1 at the prompt, N+4 becomes three and control is sent to the line number in the third position—140.

It's good programming practice to limit the responses to an INPUT, even if it's not being used with ON-GOTO or ON-GOSUB, so we'll use two IF/THEN statements to test for legal INPUT values, as shown in lines 110 and 120 below:

```
100 INPUT "NUMBER FROM ONE TO
    THREE";H
110 IF H<1 THEN 100
120 IF H>3 THEN 100
130 ON H GOTO 140, 150, 160
140 (program continues here)
```

If values outside of the requested range are entered, control returns to the INPUT statement in line 100.

ON's Other Uses

Of course, there are other ways to use ON (which is *always* used with GOSUB or GOTO) other than following INPUT statements. One of the most popular is with the RND (random) function, where programs can branch in random directions. We'll discuss RND in a future column.

Another use for ON is with the FOR-NEXT statement.

```
100 FOR T=1 TO 4
110 ON T GOSUB 200, 300, 400, 500
120 NEXT
130 END
200 (subroutine followed by RETURN)
300 (subroutine followed by RETURN)
400 (subroutine followed by RETURN)
500 (subroutine followed by RETURN)
```

This is useful for sequentially executing several subroutines, which can set up the screen or sound chip in the computer, define constants, gather the user's input, and so on.

To understand how ON is used with FOR-NEXT, type in this program:

```
100 PRINT "{CLR}{DOWN}HOW
    MANY STATES WOULD YOU LIKE
    TO SEE?"
110 PRINT
120 PRINT "1. NC ONLY"
130 PRINT "2. NC AND SC"
140 PRINT "3. NC, SC, AND VA"
150 PRINT: INPUT "YOUR CHOICE"; C
160 IF C<1 THEN 100: REM LOWER
    LIMIT
170 IF C>3 THEN 100: REM UPPER
    LIMIT
180 FOR T=1 TO C: ON T GOSUB 200,
    300, 400
190 NEXT:END
200 PRINT
210 PRINT "CAPITAL OF NC:
    RALEIGH"
220 RETURN
300 PRINT "CAPITAL OF SC:
    COLUMBIA"
310 RETURN
400 PRINT "CAPITAL OF VA:
    RICHMOND"
410 RETURN
```

Run this program three times, each time making a different choice, and observe the results. Remember: C is the user's response to the question, and T is the counter in the FOR-NEXT loop. When you type 2, for instance, C is given that value, and the program loops twice.

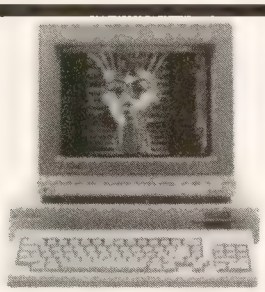
Lines 100–150 should be clear. Lines 160 and 170 limit the user's response. Please be careful to note that in line 180, ON is followed by T (the FOR-NEXT counter), *not* C (the user's input—the high limit for the counter). Lines 200–410 contain the subroutines.

Next month we'll look at the GET statement. In the meantime, try using ON in your own programs.

PANASONIC 1080i — $199.95 1091i — $259.95

MCS

DISKS 5¼ DS/DD .. $ .40 3½ DS/DD .. $1.50



BY COMMODORE® AMIGA™ 1000*
PLUS
1080 Color Monitor
90 DAYS PARTS & LABOR
$850
C.P.U. IS REFURBISHED

- Future Sound . . . $139.95
- DIGI-VIEW $159.95
- 1080 Monitor . . . $259.95
- Enhancer . . . . . $ 14.95

SIDECAR GEN LOCK CALL!

- 256K RAM . . . . . $ 79.95
- 1680 Modem . . . $159.95
- Allegra (512K) . . $299.95
- Amega (1 Meg) . $399.95

NEW LOW PRICES!

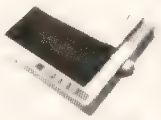
- 64C . . . $169.95
- 128 . . . . $249.95
- 1541C . . $179.95
- 1571 . . . $219.95
- 1351 . . . $ 39.95
- 1670 . . . $119.95
- 1802C . . . . CALL
- 1902 . . . . . CALL

CALL US BEFORE YOU BUY!

Over 2400 software titles in stock!

NEW star PRINTERS

NP 10 $159.95



- NX10 . . . . . $199.95
- NX10C $219.95
- NL10 . . . . . $249.95
- NX15 . . . . . $319.95

FULL LINE — CALL!

commodore SFD 1001

1 MEG $179.95

SEIKOSHA SP-1000VC

COMMODORE READY $164.95

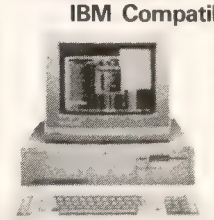
NEAR LETTER QUALITY FRICTION & TRACTOR 100 CPS SHEET FEEDER

1200 BAUD FROM $88.00 2400 BAUD

commodore Educator 64 $199.95

Commodore Compatible

commodore PC10 I IBM Compatible



- 512K
- 360K Dual Sided Drive
- CGA Board
- One year warranty
- Parallel Port
- Serial Port
- GW BASIC
- DOS 3.2

FREE Sidekick by Borland $699.95

ORDERS ONLY 800-433-7756
HOURS: MON-FRI 10:00 a.m. - 8:00 p.m. E.S.T.
SAT 10:00 a.m. - 6:00 p.m.
Customer Service Dealer Inquiries 313-427-0267

JOYSTICKS FROM $ 5.95
INTERFACES FROM $ 29.95
OKI-MATE 20 $184.95

MC/VISA/DISCOVER/C.O.D. — Please include phone number. Dealer inquiries invited, all prices discounted for cash or check. Call for shipping information. All returns are for repair/exchange only, call for auth. Prices and availability subject to change without notice. Offices are not open for walk-in traffic.

machine language for beginners

Building Trampolines

Richard Mansfield
Editorial Director

It's something of an oddity that you cannot branch further than 127 bytes forward or 128 bytes backward, whereas you can JSR or JMP as far as you want. You can give the JMP instruction an address anywhere within the 64K range of the Commodore 64 or within the 64K size of any memory bank within the Commodore 128. A BEQ (Branch if EQual) command, however, is only allowed to leap within a zone which is 255 bytes large and which extends half that much in either direction from its own location within your program.

Before speculating about the possible reason for this curious state of affairs, let's first review the uses of the branching instructions. Essentially, commands such as BEQ and BNE (Branch Not Equal) are ML's way of handling IF-THEN and ON-GOTO structures. The branching commands respond to whatever has just happened in your program and either send the program to a new location, or not:

```
        LDA 12000
        BEQ CONT
        CMP #1
        BEQ UP
        CMP #2
        BEQ DOWN
CONT go on with the program
```

This program fragment could come from a larger program which is testing the byte at memory address 12000 to see what it contains and then is making a decision about it. If 12000 holds a zero, we jump to the location within our program called CONT and simply proceed with the program. If, however, address 12000 contains a 1, we branch to a routine called UP. UP has to be somewhere nearby since branches must be within that 255-byte-large zone. If 12000 contains a 2, we go to the subroutine labelled DOWN.

No Cause For Concern

The programmer, however, need not worry that the targets (CONTINUE, UP, and DOWN in our example above) of branch commands are, in fact, within the bounds, within the 255-byte limit. All reasonable assemblers will detect any such problems and report BRANCH OUT OF RANGE. It's usually relatively simple to correct the problem by moving things around a little.

Once in a while, though, you'll *need* to branch some distance from a branching instruction. One such dilemma arises when there's just no easy way to correct a BRANCH OUT OF RANGE error. In these cases, you can simulate a far branch by inserting a JMP as the target of a branch, like this:

```
        LDA 12000
        BEQ CONT
        CMP #1
        BEQ UP
        CMP #2
        BEQ DOWN
CONT    JSR MAIN
DOWN    JMP DOWN1
```

What we've done is create a "trampoline" and labelled it DOWN. Now we can locate the subroutine DOWN1 anywhere in 64K of memory because the JMP instruction uses a two-byte address. So, if there is a 2 in the byte at address 12000, we branch to DOWN, but DOWN can bounce us anywhere we need to go. This might seem a bit indirect, but it's pretty simple to program. The reason we have to go through this indirection is that the JMP instruction cannot make decisions and the branching instructions cannot go very far.

A Massive Structure

If you are planning a massive ON-GOTO structure, for example if you are branching to many places within your program as the result of a user's choice from a large menu, you might want to set up a series of JMPs in this way:

```
        LDA CHOICE
        BEQ CHOOSE
        CMP #1
        BEQ ONE
        CMP #2
        BEQ TWO
        CMP #3
        BEQ THREE
ONE     JMP ONE1
TWO     JMP TWO1
THREE   JMP THREE1
```

In this example there is a nearby subroutine, called CHOOSE, which continually tests to see if the user has indicated his or her preference from your program's menu of choices. This CHOOSE subroutine either leaves a zero (if there has been no choice yet) or the number associated with one of the items on the menu. If there is no choice yet, we branch up to CHOOSE and try again. If a choice has been made, we branch down onto one of our waiting trampolines, and we're off to the correct subroutine.

By the way, we don't have any hard information on why branching was limited to short distances, but we can make a reasonable assumption that it had to do with memory conservation. Far branching would require *two-byte addresses*. In the early days of personal computers (back, say, six years) when the 6502, the granddaddy of the 6500 family of microprocessers, was designed, computers had only 8K or less of RAM within which to write programs. Since branching is such a common event and since short-distance branching is usually all that's needed, it was felt that the savings in memory usage achieved with one-byte branch addressing was worthwhile. When you've got only 8K, every byte counts. More recent microprocessors, such as the 68000, feature "far branch" instructions which, with respect to their reach, are identical to jump and gosub commands.

Easy ML Line Drawing

Paul Carlson

Drawing lines on the 128 with machine language is a lot easier than you might think. And it's much faster than with BASIC. As an example of the effects possible, an excellent demonstration program is included.

The 128's BASIC 7.0 has all the graphics commands that the 64 lacked. These commands are also available to machine language (ML) programs. In this article I'll show you how to use the line-drawing routine. Even if you're not interested in ML programming, you might be interested in typing in the program—it's an enhanced version of the classic "walking lines" demo program.

The line-drawing routine is among the easiest of the BASIC 7.0 ROM routines to use. Even if you're just beginning to program in machine language, you shouldn't have much trouble using it.

The line-drawing routine has a jump table entry at address $AF72 (a $ means that the number is in hexadecimal). The routine gets the color source and the starting and ending coordinates for the line from the following memory locations in RAM (all coordinates are in standard low-byte/high-byte form):

$0083	color source
$1131–$1132	starting *x* coordinate
$1133–$1134	starting *y* coordinate
$1135–$1136	ending *x* coordinate
$1137–$1138	ending *y* coordinate

When the line-drawing routine is called, the values in these memory locations determine the color and location of the line. After the routine has drawn a line, it moves the values from the ending coordinate addresses to the starting coordinate addresses. This makes it easy to draw connected lines—after the first line is drawn, only the new ending point needs to be loaded. As an example, the following routine draws a line from (10,20) to (150,80) with color source 1, and then draws to (40,120) with color source 2.

```
LDA   #$00     ;set high bytes of
STA   $1132    ; starting
STA   $1134    ; and ending
STA   $1136    ; coordinates
STA   $1138    ; to zero.
LDA   #$0A     ;load 10 ($A) into
STA   $1131    ; starting x.
LDA   #$14     ;load 20 into
STA   $1133    ; starting y.
LDA   #$96     ;load 150 into
STA   $1135    ; ending x.
LDA   #$50     ;load 80 into
STA   $1137    ; ending y.
LDA   #$01     ;load 1 into
STA   $83      ; color source.
JSR   $AF72    ;draw first line
LDA   #$28     ;load 40 into
STA   $1135    ; ending x.
LDA   #$78     ;load 120 into
STA   $1137    ; ending y.
LDA   #$02     ;load 2 into
STA   $83      ; color source.
JSR   $AF72    ;draw second line
RTS            ;return.
```

Although the graphics mode can be set using machine language, it's best to use the BASIC GRAPHIC statement, which initializes certain memory locations used by the line-drawing routine. Likewise, it's best to use the BASIC COLOR statement to define the color sources. The routine above assumes that the multicolor mode has been set and color sources 1 and 2 have been defined by the BASIC program that calls the routine.

Why bother with machine language at all, when the BASIC DRAW statement can do the same thing? The reason is *speed*. BASIC may not be fast enough when many lines need to be displayed in a short time. The program accompanying this article demonstrates the speed possible when a machine language routine is used.

Walking Lines

Type in "Walking Line Demo." Since it contains a machine language program in DATA statements which must be typed accurately, use "The Automatic Proofreader," found elsewhere in this issue, to enter the program. Be sure to save a copy of the program before running it.

After you've saved a copy, load and run the program. You'll see a bundle of lines walking across the screen. Press any key to stop the demo.

See program listing on page 104.

COMPUTE!'s Gazette is looking for utilities, games, applications, educational programs, and tutorial articles. If you've created a program that you think other readers might enjoy or find useful, send it, on tape or disk to:

Submissions Reviewer
COMPUTE! Publications
P.O. Box 5406
Greensboro, NC 27403

Please enclose an SASE if you wish to have the materials returned. Articles are reviewed within four weeks of submission.

Alphabetizing

Todd Heimarck
Assistant Editor

Computers are great at alphabetizing—they don't make mistakes and they don't complain about how boring the job is.

This month we'll take a look at two sorting algorithms: the bubble sort and the Shell sort. (Shell is capitalized, by the way, because it's named after Donald Shell, its inventor.) Both sorts, including the demonstration programs here, apply to any Commodore computer.

Four Rules

Sorting programs work in a variety of ways, but they all have four things in common. The first rule is that the items to be put in order, whether they're strings or numbers, must be in an array. At the beginning of the program, use the DIM command to set the dimension of the array. If the list has room for 50 items and is called B$, you'll put **DIM B$(50)** in one of the first lines. To find a single element in the array, use a number or a numeric variable in parentheses after B$. The 26th item on the list will be B$(26). If you're sorting numbers—batting averages, for example—use a numeric array such as B(X).

The second rule is that you have to initialize the values in the array. Like all other variables on the 64 or 128, newly created arrays are empty. Numeric arrays start out filled with zeros; string arrays begin as a collection of null strings (strings that contain nothing, with a length of zero). To initialize the array, you could type in the values yourself. Or you could put the values in DATA statements and READ them into the array. Or you could store them in a disk file and initialize the array by reading the file. The example programs set up the array by selecting characters at random.

Third, you need a way to compare two items in the list, to see if they're in the right order. In BASIC, you use the greater than (>) and less than (<) operators, which work on both numeric and string variables. The heart of a sorting routine is the section where the computer loops through the list to find out which items are incorrectly placed.

Finally, if two strings or numbers are in the wrong order, you have to switch them with a line like this: **T$=A$: A$=B$: B$=T$.**

The Bubble Sort

For short lists, a bubble sort is adequate. In terms of speed, however, it's not a good choice, as we'll see later. For explaining how a sort works, the bubble sort is excellent because it's short.

Let's say you have an array of ten strings. The following three lines will put the array in partial order:

```
10 FOR J = 1 TO 9
20 IF N$(J) > N$(J+1) THEN T$=N$(J):
   N$(J)=N$(J+1):N$(J+1)=T$
30 NEXT
```

The FOR-NEXT loop counts from 1 to one less than the size of the array (9, in this example). The variable J is the counter for the loop and an index to the array. The IF-THEN in line 20 compares one member of the array to its neighbor on the list. As J counts from 1 to 9, N$(1) is compared to N$(2), then N$(2) is compared to N$(3), and so on until the final pass through the loop, where N$(9) is compared to N$(10). This covers the final two items in the array, and it's why the loop counts up to 9, when the array size is really 10.

If two strings are out of order, they're swapped. Now let's say N$(2) equals *ZELDA* and it's alphabetically the last string on the list. The first comparison leaves N$(1) and N$(2) in place. The second comparison switches 2 and 3 (now N$(3) is *ZELDA*). The third moves our string down to N$(4), and so on. When the loop has finished, N$(10) holds *ZELDA*. We can't predict whether any of the first nine strings are in order, but we know that the last item in the array is correct.

Each time the loop is repeated, one more item falls into place. Eventually, the list will be sorted. The main bubble sort routine is found in lines 120–180 below. The outer loop starting at line 120 counts backwards from 79 to 78 to 77, down to 1. The inner loop counts from 1 to M—1 to 79, then 1 to 78, 1 to 77, and so on.

Since we know that the first pass puts the last element in place, it's not necessary to check it in the later loops. The second pass puts the penultimate string (number 79) in its place, so it doesn't need to be checked anymore.

Bubble Sort

```
RK 10 Z=80:DIM C$(Z):M=RND(-10
      0)
BB 20 FOR M=1TOZ:L=INT(RND(1)*
      6+3)
AJ 30 FOR N=1TOL:C$(M)=C$(M)+C
      HR$(INT(RND(1)*26+65)):N
      EXT:PRINTC$(M),
AM 40 NEXT:PRINT CHR$(147);
KC 50 GOSUB100:GOSUB100
GH 60 GETA$:IFA$=""THEN60
QD 70 END
AC 100 PRINT"SORTING"
MS 110 M=FRE(0):TI$="000000":C
       P=0:SW=0
FC 120 FOR M=(Z-1)TO1STEP-1
SE 130 FOR N=1TOM:CP=CP+1
XP 140 IF C$(N)<C$(N+1) THEN17
       0
GK 150 SW=SW+1
HE 160 T$=C$(N):C$(N)=C$(N+1):
       C$(N+1)=T$
SQ 170 NEXT
MR 180 NEXT
KM 190 PRINT TI;"JIFFIES",CP;"
       COMPARISONS"
CH 200 PRINT SW;"SWAPS"
GQ 210 FOR M=1TOZ:PRINTC$(M),:
       NEXT:PRINT
CD 220 RETURN
```

Line 140 compares two strings. If they're in place, the program skips ahead to line 170. The CP variable in 130 and SW in 150 aren't really necessary. They're

there to keep track of how many comparisons and swaps are made.

A Modified Bubble

Examine line 50 in the program above and you'll see that the bubble sort routine is called twice. The first time, the list is in random order. The second time, the array is in order. If you run the program, the program makes 3160 comparisons before it finishes (the number of comparisons is predictable: Take the length of the list, 80; multiply by the next number down, 79; and divide that number by 2). The first sort takes 4387 jiffies (73.12 seconds; a jiffy is 1/60 second). The second sort, when the list is already in order, takes 2610 jiffies (43.5 seconds). Both times there are 3160 comparisons.

The program can be modified to make it run faster when the list is sorted (or mostly sorted):

Modified Bubble Sort

```
RK 10 Z=80:DIM C$(Z):M=RND(-10
      0)
BB 20 FOR M=1TOZ:L=INT(RND(1)*
      6+3)
AJ 30 FOR N=1TOL:C$(M)=C$(M)+C
      HR$(INT(RND(1)*26+65)):N
      EXT:PRINTC$(M),
AM 40 NEXT:PRINT CHR$(147);
KC 50 GOSUB100:GOSUB100
GH 60 GETA$:IFA$=""THEN60
QD 70 END
AC 100 PRINT"SORTING"
MS 110 M=FRE(0):TI$="000000":C
       P=0:SW=0
HF 120 FOR M=(Z-1)TO1STEP-1:F=
       0
SE 130 FOR N=1TOM:CP=CP+1
XP 140 IF C$(N)<C$(N+1) THEN17
       0
XD 150 SW=SW+1:F=1
HE 160 T$=C$(N):C$(N)=C$(N+1):
       C$(N+1)=T$
JA 170 NEXT:IF F=0THENM=0
MR 180 NEXT
KM 190 PRINT TI;"JIFFIES",CP;"
       COMPARISONS"
CH 200 PRINT SW;"SWAPS"
GQ 210 FOR M=1TOZ:PRINTC$(M),:
       NEXT:PRINT
CD 220 RETURN
```

The variable F has been added to lines 120, 150, and 170. It acts as a flag that indicates whether or not a swap has occurred during each pass of the outer loop. Obviously, if no swaps have been made, the list is in order and no more sorting is needed. If F is still zero after the inner loop finishes, the sort routine ends. Now the scrambled list requires 3139 comparisons instead of 3160 and the sorted list needs 79 instead of 3160.

The Shell Sort

As the size of the list grows larger, bubble sorts become very slow. Run one of the bubble sort programs above and note the time. On a 128 in 64 mode, the first program took 4387 jiffies (73.12 seconds). Now change the first part of line 10 to read Z=160. That doubles the size of the list. Run the program again and it takes 18,649 jiffies (310.82 seconds). The list has doubled in size, but the time used by the sort program has quadrupled.

Here's an improved sorting program (lines 10–70 are the same):

Shell Sort

```
RK 10 Z=80:DIM C$(Z):M=RND(-10
      0)
BB 20 FOR M=1TOZ:L=INT(RND(1)*
      6+3)
AJ 30 FOR N=1TOL:C$(M)=C$(M)+C
      HR$(INT(RND(1)*26+65)):N
      EXT:PRINTC$(M),
AM 40 NEXT:PRINT CHR$(147);
KC 50 GOSUB100:GOSUB100
GH 60 GETA$:IFA$=""THEN60
QD 70 END
GC 100 PRINT"SORTING":GP=Z
MS 110 M=FRE(0):TI$="000000":C
       P=0:SW=0
JK 120 GP=INT(GP/2):IFGP=0THEN
       200
HB 130 F=0
KR 140 FOR M=1TO(Z-GP):CP=CP+1
CM 150 IF C$(M)<C$(M+GP)THEN17
       0
XB 160 T$=C$(M):C$(M)=C$(M+GP)
       :C$(M+GP)=T$:SW=SW+1:F=
       1
SQ 170 NEXT
KS 180 IF F THEN130
SS 190 GOTO120
AP 200 PRINT TI;"JIFFIES",CP;"
       COMPARISONS"
GE 210 PRINT SW;"SWAPS"
MR 220 FOR M=1TOZ:PRINTC$(M),:
       NEXT:PRINT
GE 230 RETURN
```

The Shell sort uses a gap (the variable GP) that's initialized to half the size of the list. For an 80-element array, GP would start at 40. Instead of comparing neighboring strings, you compare strings that are separated by 40. The first time through the main loop, C$(1) is compared to C$(41), C$(2) is compared to C$(42), and so on. When no more swaps can be made, the gap is cut in half and rounded down to 20, then 10, 5, 2, and 1.

The advantage to using the gap is that it helps strings move faster and farther. Let's use the *ZELDA* string as an example again. In a bubble sort of 80 strings, it takes 79 swaps to move *ZELDA* from the top of the list to the bottom, a time-consuming process. The Shell sort moves it 40, then 20, then 10. After only three comparisons, the wayward string has moved a total of 70 spots on the list.

How much faster is a Shell sort? Consider the following times:

	80 strings	160 strings
Bubble	**4387 jiffies**	**18,649 jiffies**
Shell	**1860 jiffies**	**5001 jiffies**

Doubling the size quadruples the time for a bubble sort, but it only multiplies the Shell sort time by about 2.7. The longer the list to be sorted, the better the Shell sort performs, as compared to the bubble sort.

COMPUTE!'s GAZETTE
TOLL FREE
Subscription
Order Line
1-800-247-5470
In IA
1-800-532-1272

SONY
3.5" DISKETTES
Certified by Apple for MacIntosh™
- **Safety Auto Shutter** protects against fingerprints and dust
- **Safety Auto Design** is heat-resistant and guards against disk damage during handling

Price Per Diskette

	SS	DS
Box	1.09	1.59
Bulk	1.17	1.29

GUARANTEED 100% ERROR FREE

POLY PACK 5¼" DISKETTES
33¢ Each
- Blank Jackets
- WP Tabs
- Envelopes

100% ERROR FREE
Sold in Lots of 100 Only

QUALITY PRINTER RIBBONS

Apple Imagewriter ..... $3 95 ea
Okidata 80/82/83 ..... $1 49 ea
Epson LX 80/90 ..... $2 95 ea

Sold 6/Box (Minimum)
Min. Order $25 00 S&H Continental USA. $4 00/100 or fewer disks discount at 300. Ribbons $.25 each Foreign orders APO/FPO, please call MI residents add 4% tax. Prices subject to change without notice Hours 8 30 AM - 7 00 PM

VISA MasterCard

Precision Data Products™
P.O. Box 8367, Grand Rapids, MI 49518
(616) 452-3457 • Michigan 1-800-632-2468
Outside Michigan 1-800-258-0028

64/128 Sprite Printer

Mitchell Ross

To look at a sprite shape, you can PEEK into memory. But it takes a long time to convert the numbers into spots on graph paper. Here's how to let the computer do the work.

First you have to know where the sprite is located in memory. On the 64 and 128, you can PEEK locations 2040–2047 to find the pointers for the eight sprites. (For sprites used on the 128's hi-res screens, GRAPHIC 1–4, substitute 8184–8191.) For example, if you have a 128, PRINT PEEK(2040) should return the number 56. That's the pointer to the first sprite. Multiply the number by 64; that tells you where the 63 bytes of the sprite shape are located in memory. In this case, sprite zero is found at 56*64, or 3584.

The 64 doesn't have an area of memory reserved for sprites, but I often use the area starting at 12288 in my programs. Once you know where the sprite is, run this short program:

```
5 OPEN1,3
10 SL=12288
20 FORJ=SLTOSL+60STEP3:A$=""
30 FORK=JTOJ+2:M=128:SB=PEEK(K
   )
40 FORL=1TO8
50 IF SBANDM THENA$=A$+"*":GOT
   O70
60 A$=A$+CHR$(32)
70 M=M/2
80 NEXTL:NEXTK:PRINT#1,A$
90 NEXTJ
```

It's written for a sprite that starts at 12288. For other memory locations, just change the value of SL in line 10. The sprite shape prints on the screen (in line 5, device 3 is the screen). If you own a printer, you can print out the shape by changing the first line to OPEN 1,4. You must also close the printer channel by adding PRINT#1: CLOSE1 as a final line.

Instant 128 Help Screens

Anders Frankel

Here's a time- and memory-saving technique for people who own a 128 (or a 64 with a machine language monitor). Screen memory on both computers starts at 1024. If you have an introductory screen for a game or a series of help screens, you could put the information for one screen in a series of 25 PRINT statements. But if you have six pages of text, you'd need 150 PRINT lines. The following idea will allow you to banish all those PRINT statements from a program.

On the 128, go into the monitor by typing MONITOR. Clear the screen and type whatever you like to create the screen you want. When the screen looks right, cursor down to the second-to-the-last line and type **S *"filename"*, 08, 400, 800** and screen memory will be saved to disk. This same idea can be used by 64 owners who have *Micromon, Supermon,* or some other ML monitor.

The line with the filename will be saved along with the main screen. To avoid seeing that line, you can write a short BASIC program (128 mode only) that sets up the screen and then executes **BSAVE *"filename"*,B0,P1024 TO P2023**.

Once the screen is on disk, you can BLOAD it back into memory on the 128. On the 64, you'll have to use a line like this at the beginning of the program:

```
IF A=0 THEN A=1:LOAD "SCREEN1"
,8,1
```

If you have a 128 memory expander, the screens can be STASHed in expansion memory, then FETCHed for nearly instant access.

Turbo-Plus/4

Robert G. Boomers

Although the VIC, 64, 16, Plus/4, and 128 all have an internal clock speed of 1 MHz (one million cycles per second), they don't run BASIC programs at the same speed. In fact, if you time a FOR–NEXT loop that counts to 10,000, you'll find that the VIC-20 is the fastest Commodore computer, followed in order by the 64, the Plus/4 and 16, and the 128. Put the 128 in FAST mode (2 MHz), and it jumps to number 1 on the list. Does this mean Plus/4 owners are doomed to remain in last place on the list of who's hot and who's not? Not necessarily.

It's not very well known, but the speed of the Plus/4 and 16 can be increased tremendously by turning off the screen. **POKE 65286,11** turns it off and **POKE 65286,27** turns it back on. The increase in speed is roughly 30–40 percent, quite an improvement in programs that do lots of calculations (sorts, for example). It doesn't speed up the clock—it just frees the Plus/4 from having to update the screen.

With the screen turned off, suddenly the Plus/4 and 16 jump out in front of the VIC and 64. Only the 128 in FAST mode is faster than a Plus/4 with a blank screen.

If you're writing programs for others to use, they may be disconcerted to see the screen suddenly disappear. Also, if you're developing a program and it stops with an error, you won't see the error message because of the empty screen.

Since the screen blanks to the same color as the border, you can indicate that the program is still running by changing the border color occasionally while the screen is disabled. Insert a few COLOR 4,*x* lines in your program, where *x* is a number in the range 1–16. Both the border and the blank screen will change to the color you've chosen, and you'll be able to tell that the program is working.

No-SYS Loader

Walter L. Smith, Jr.

Now machine language programs can be as easy to handle as BASIC programs. With this 64 utility, running, loading, and saving most machine language programs is a snap. A disk drive is required.

Machine language (ML) programs are more difficult to load, run, and copy than their BASIC counterparts. "No-SYS Loader" narrows the gap between the two, allowing most ML programs to be treated like BASIC programs.

No-SYS Loader works by combining the ML program with a short BASIC loader to produce a new program that can be loaded, saved, and run like a BASIC program. When the program is run, the loader transfers the ML to its correct location, performs a NEW, and, if necessary, resets certain BASIC pointers.

Typing It In

No-SYS Loader is written in machine language. It must be entered using the "MLX" machine language entry program found elsewhere in this issue. When you run MLX, you'll be asked for the starting and ending addresses of the data you'll be entering. For No-SYS Loader, respond with the following values:

Starting address: 0801
Ending address: 0A88

After entering the data, be sure to save a copy of the program.

As an example of using No-SYS Loader, let's convert the game "Powerball" from this issue to BASIC loader form. First, load No-SYS Loader and type RUN. The program asks for a filename. Make sure that a disk containing a copy of the Powerball program is in the drive; then type POWERBALL (or whatever name you used to save that program). No-SYS Loader finds the file on disk and tells you its load address. In the case of Powerball, this address is 49152.

No-SYS Loader next asks for the SYS address that starts the program. For Powerball, type 49152. Or, since the load address and SYS address are the same, you may simply press RETURN instead of typing the address.

No-SYS Loader now gives you the opportunity to insert a remark into the program. For Powerball, you may want to type *May 1987 Gazette* so you'll know where to find instructions for the game. *Be sure that the remark you enter contains no more than 19 characters.* The program doesn't check the length of your input, and if you enter too many characters, the resulting program will crash when run.

Now insert the disk on which you want the converted program saved. Enter the filename for the converted file. Let's assume you type POWERBALL. The converted program is saved to disk.

To make sure that the program is working correctly, enter these lines:

```
LOAD"POWERBALL",8
LIST
```

You should see these lines on the screen:

```
10 SYS2088
20 REM your comment
```

The SYS address will always be 2088. This is the address of the loader, not the ML program. Run the program to see if it works properly.

Now that the program has been converted, it's easy to make copies. For example, to make a copy of Powerball, type

```
LOAD"POWERBALL",8
```

Then change disks (if desired) and type

```
SAVE"NEW NAME",8
```

Notes

A limitation of this program is that it will not convert programs that load below address 2304 ($0900). You'll find, however, that there are few ML programs that load below this address.

If the converted program is to be used as a utility for a BASIC program, the converted program must be loaded and run first, or else it will erase any BASIC program currently in memory. An example is "Fill-64" from the November issue.

See program listing on page 100.

Dazzlers

Paul Carlson

The most impressive screen displays on the Commodore 64 are done with high-resolution graphics. But you'll be surprised at what can be done in low resolution. These short programs demonstrate some eye-dazzling kaleidoscopic displays—using just the text screen.

When most people think of computer graphics, they think of high-resolution drawings and video games. "Dazzlers" should change that. Although the resolution is very coarse—the same as that of a text screen—the flowing colors and simulated movements are fascinating to watch.

Program 1 is the main program for Dazzlers. It POKEs a machine language program into memory and prepares the screen for the Dazzler routine. Five sample subroutines are included to help get you started.

Typing It In

To begin, type in Program 1—the Dazzler main program. Be sure to type the program in accurately since it contains a machine language program in the DATA statements. This program will not run without a subroutine beginning at line 100, but if you save a copy now, it will be easy to generate complete Dazzler programs. Save the program with a statement like this:

```
SAVE"DAZZLER MAIN",8
```
(tape users substitute ,1)

Now, when you want to write a Dazzler, load the main program and type in a subroutine. As an example, let's use Program 2 (Subroutine 1). First, load the main program with this line:

```
LOAD"DAZZLER MAIN",8
```
(tape users substitute ,1)

Then, with the Dazzler main program in memory, type in Program 2. When you've finished, save the complete Dazzler program with a line like this:

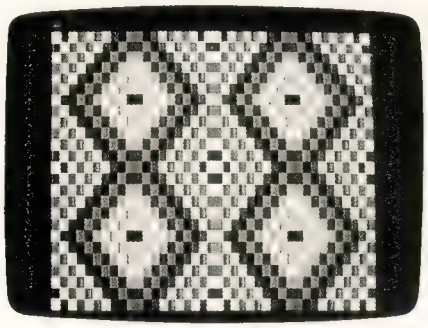
```
SAVE"DAZZLER 1",8
```
(tape users substitute ,1)

Now, you may load and run the completed Dazzler program.

More Dazzlers

Programs 3, 4, 5, and 6 contain alternative subroutines for Dazzler. By following the above procedure with each of these programs, you'll have five different Dazzler programs.

You can create your own displays by altering the subroutines provided. Dazzlers work by POKEing different colors into color memory. When you write your own Dazzlers, be sure to POKE only values in the range 0–15 into locations 55296–56319. For example, POKE 55301,12 is valid; POKE 55219,17 is not. In addition to POKEing to color memory in your subroutine, you may also print text to the screen. In this way you can create your own colorful, personalized messages.



The colors cascade across the screen in this graphics teaser—one of five different patterns included.

The Engine

For those who may be interested in the machine language program (Program 1), we have included the source code listing as Program 7. You don't need to type this in—the object code is included as DATA statements in the Dazzler main program.

See program listings on page 104.

Fast Boot

Jim Allen

Once you're used to the speed and efficiency of autobooting programs on the 128, it's a disappointment when you return to work in 64 mode. This clever utility offers a solution. A disk drive, either 1541 or 1571, is required.

Normally, the 128's autoboot feature is unavailable in 64 mode. "Fast Boot" lets you insert a disk in the drive, turn on the computer, and, within a matter of seconds, have a 64 program appear on the screen. If you have a 1571, Fast Boot also allows for loads up to five times faster than standard 64 mode loads. Since some games and utilities consist of more than one program, Fast Boot allows you to load as many as three programs at once.

Typing It In

First, type in Program 1, "Fast Boot ML Maker," and save it with the filename FASTBOOT M/L PRG. Be sure to use the "Automatic Proofreader" program located elsewhere in this issue to insure accurate entry. After typing it in and saving a copy, type RUN. Program 1 writes four machine language files to the disk for use by Program 2. After the ML files are created, you shouldn't need to run Program 1 again.

Next, type in Program 2, "Fast Boot." This program should be saved on the same disk with the ML programs created by Program 1. Be particularly careful when entering lines 0–9. These lines must be typed *exactly* as they are printed in the listing. Don't renumber Program 2 or add or delete any REM statements.

When you're ready to use Fast Boot, be sure that the drive is turned on and that it contains a disk with Program 2 and the ML files created by Program 1. Then load and run Fast Boot (Program 2). Fast Boot will load the ML files, then ask you to put the program disk in the drive. At this point, you should remove the disk containing Program 2 and insert the disk which contains the Commodore 64 program or programs that you'd like to have autobooted on the 128. (Fast Boot works *only* with Commodore 64 programs.) When you're ready, press the space bar to continue.

Fast Boot asks if you'd like a directory listing of the disk. Press Y to see a listing. Next, you're asked for the number of programs to autoload. This can range from 1 to 3. You must then give the filename of each 64 program that you want autoloaded. For each one, you must describe the program as BASIC or BINARY (for BASIC and machine language programs, respectively), and LOAD (to load the program only) or RUN (to load and run it). For machine language programs that load and run the same as BASIC—*SpeedScript*, for example—you must choose the BASIC option rather than the BINARY option.

Fast Boot will then prompt you for a new disk, the disk to be made autobooting. Remove the program disk and put the new disk in the drive. You can use a blank (unformatted) disk if you wish; Fast Boot will offer you the option of formatting the new disk.

Several files are written to the new disk. When Fast Boot ends, the new disk should be set up to autoboot the specified program or programs. Test the autoboot disk by turning the 128 off, and then back on. Your 64 program should load automatically, and also run if you specified the RUN option.

Notes

BASIC programs load higher in memory when the computer is in 128 mode, so conflicts are possible when more than one program is being loaded. For instance, the 64 version of *SpeedScript* can be autobooted, but you cannot use Fast Boot to autoboot *SpeedScript* and also load a *SpeedScript* text file.

Do not attempt to load or run BASIC programs that were not saved from 64 mode or from a Commodore 64. If you have a program that works in both 64 and 128 mode, be sure that you save the program from 64 mode before attempting to make it autoboot.

See program listings on page 95.

Gameports: Joystick, Paddle, And Mouse

Jim Butterfield

In this article, Jim Butterfield discusses how Commodore 128 and 64 game controller ports work, and he looks at the input devices that run through these ports. Also included are programs that test the ports and input devices.

The game controller ports of the Commodore 64 and 128 are quite versatile. To them, we can connect joysticks, paddles, mice, light pens, and other devices such as graphics tablets.

Unfortunately, these devices sometimes fail; and occasionally the circuitry within the computer stops working. It's useful to be able to check the system out. The programs given here allow you to test the ports as well as devices connected to the ports. They may also help you see how to go about your own programming of these devices.

Two Main Devices

There are two principal types of interface through the controller ports: *digital* and *analog*. The digital interface sends only on/off signals—it's often called a *joystick* interface, since the joystick is the most commonly used device of this type. The analog, or proportional, interface sends a continuously variable signal—it's often called a *paddle* interface, since game paddles are the most common devices of this kind. You'll also hear the analog connection called a *potentiometer* (or *pot*) interface. That's an electronics term—most of us know a potentiometer as the volume control on a radio. Paddles usually have *fire buttons*, which are on/off in nature, so the paddle interface has some digital input as well as analog.

A third type of interface is available on port 1 of the Commodore 64 and 128: the light pen. This is quite different from the joystick and paddle interfaces in that the light pen reading is calculated from the precise timing of the signal it sends to the computer. We won't deal with light pen operations here.

The joystick is the best-known peripheral device that connects to the game controller port. As we've mentioned, it's a digital device, sending on/off signals. The five possible signals from a joystick are up, down, left, right, and fire. Combinations are possible, so that we could simultaneously send down and left, or a three-way combination such as up, right, and fire. It would be an unusual joystick system that allowed sending simultaneous up and down signals, but from a technical standpoint even these apparently contradictory signals would be clearly understood by the computer.

You may occasionally hear of a *proportional* type of joystick. This is the type of joystick used with Apple II and IBM computers. This device sends an *analog* signal; instead of simple up or down, it sends continuously variable horizontal and vertical position values. Proportional joysticks are read like paddles, through the analog portion of the port. This type of interface is used in such devices as the MicroFlyte interface for *Flight Simulator II*, which gives more of the feeling of continuous control that a real aircraft joystick would provide.

The paddle was common with some of the first video games. Tennis-type games, where each of two players would need to position a bat on the screen to keep a ball in play, almost invariably used paddles. They are still around, although joystick-oriented games have overtaken them in popularity.

Newer Interfaces

Since the introduction of the joystick and paddle, newer devices have come into use. These use the same digital and analog interfaces—a program picks up their signals in the same way. Some of these devices are versions of the earlier interfaces; for example, a trackball is an alternative to a joystick. Others change the nature of the user interface—although a graphics tablet uses the same connections as a pair of paddles, it will be put to a completely different use.

The *trackball* is a ball set into a freely rotating mounting so that it can be rotated easily in any direction. Its effect is the same as that of a joystick; it signals direction digitally. Roll it to the right, and the joystick port will detect a right signal until movement stops. Note that there's no speed indication—the computer sees the same signal whether the ball is moving quickly or slowly. Trackballs cost more than joysticks, but usually last longer; and they can be used for more precise control in such applications as drawing with a joystick.

The *graphics tablet* has many physical implementations. In general, it allows you to indicate a screen position by pressing a pointer against a selected location on a rectangular board called a *tablet*. The pointer might be an electrically or mechanically interfaced device. On some tablets, your finger could do the job (with less accuracy). Although the tablet is physically separated from the screen, most users find that good hand/eye coordination (hand on tablet, eye on screen) is helpful when sketching or selecting an area of the screen. Typically, the paddle interface connections are used to send horizontal and vertical position coordinates to the computer.

The Mouse

The mouse is easy to recognize. It's a small rectangular device with two or three buttons, and it rolls across the table or a special mat. Technically, mouse operation varies widely.

A mouse such as the Commodore 1350, which sends only directional signals, is not a true mouse. The computer knows the direction of travel, but not the speed. In effect, the mouse is an upside-down trackball, and can be read the way a joystick is read. As such, it does some jobs well, and others poorly.

A true mouse is more than a joystick; it must somehow give both direction and speed to the computer (either that, or position, which amounts to the same thing). Some mice operate on an *interrupt* principle: Every time the mouse moves a certain distance, it sends a signal to the computer that it has done so. The processor interrupts whatever it is doing to log the mouse's movement, and then returns to its previous work. If the mouse is moved quickly, the processor services more interrupts—if slowly, fewer interrupts. In either case, the processor knows exactly where the mouse is at all times, and can track the movement regardless of speed.

The Commodore 1351

The new Commodore 1351 mouse has a built-in processor. When it's being used as a true, proportional mouse (and you may select this as an option), it calculates its position based on observed movement. It then reports its position to the computer. This is a useful way of doing things, since you get true mouse operation with no interrupt load on the computer.

When used in this way, the 1351 has a special problem which needs to be recognized by the computer. Its position reports (both horizontal and vertical) can go over the edge. Suppose I move the mouse right until its horizontal position reading is reported as the maximum value. What happens if I move the mouse still further right? You've probably guessed that the position reading wraps around to its lowest value, and then starts moving up again. The computer needs to understand this behavior so that going over the edge isn't mistaken for a large movement in the opposite direction.

The position reported by the 1351 covers a range of 128 possible values in both the horizontal and vertical dimensions. Since a PEEK of the paddle ports gives a number from 0 to 255, Commodore suggests you eliminate the high bit of the reading; you'd do this with the AND function. The Commodore 64 statement to properly read the 1351 might read X=PEEK(54297) AND 127. On the Commodore 128, you'd use X=POT(1) AND 127. Further, Commodore suggests that the lowest bit received from the 1351 be treated as jitter. To do this, replace the 127 above with 126. As a result of losing these bits, the 1351 supplies only 64 valid positions to the computer. This is not a serious limitation. By recognizing and tracking the wrap-around feature, a program could calculate thousands of coordinate positions.

If you just want to use the 1351 as a joystick, you may select this as an option at the time of computer power-up. Just hold down the right button of the mouse as you turn the power on, and it will become a non-proportional joystick-type device like the 1350. By the way, the 128's reset button won't do the job—the power supply to the 1351 must be turned off before it can reconfigure.

Problems

Joysticks can fail or turn erratic. Paddles can become "noisy" so that the readings they supply jump around randomly. Many programs try to cover for this by averaging readings received from paddles, but if the problem gets too bad, the interface is unusable. The computer's interface ports can fail. Damage to a chip can make the computer unable to detect the signals supplied by the device.

You may have seen warnings that you should never connect or disconnect a control port device while the computer's power is on. That's good advice, and is especially true of paddles and active devices that draw power, such as graphics tablets and most mouse devices.

Occasionally, changing a device seems to be unavoidable. For example, *GEOS 1.2* insists that you start by using a joystick, later giving you the option of switching to a different input device. It seems you are stuck with a live device change—to select the new input device you must use the old device (the joystick), then unplug the old and plug in the new. In the case of *GEOS*, the best solution is to upgrade to *GEOS 1.3*, which allows you to select the input device by means of the keyboard.

If live switching of a device seems unavoidable, check the connector. Some connectors are plastic on the outside, and others are metal-clad. Don't ever try to do a live switch with one of the metal-exterior connectors—you're almost sure to hit a couple of pins on the socket and cause damage to your computer's interface chip.

The Programs

The "Gameport Test" programs report what the computer sees—and if the computer doesn't see input from a device, either that device or the interface is bad. To find out which is at fault, switch ports or try another device.

Two versions of the Gameport Test program are provided: one for the Commodore 64 or Commodore 128 in 64 mode; the other for the Commodore 128 in 128 mode.

Connect the device or devices you wish to test; then turn on the computer and load the program. Exercise the device gently—the program's response is a little sluggish, and rapid motion might not be detected.

You may discover things you didn't know about these devices.

For example, most paddles have a "dead spot" where movement is not detected. Some joysticks are good at detecting diagonal movement (such as simultaneous up and left), and some are not so good. You might like to explore devices—for example, a graphics tablet that you may have used with a custom program—so you can get a better idea of how to use them in your own programs.

It's interesting that the 64 program doesn't work properly on the Commodore 128 in 128 mode. Even though all the PEEK locations are in the same place, the 128's interrupt structure is more active, so that the system is PEEKing the interfaces at the same time you are doing so. This causes confused readings.

By studying the program listing—written entirely in BASIC—you may get a better insight into how to write your own interface programs. The programs are good for device testing, and offer some insight into how the devices work.

See program listings on page 104.

COMPUTE!'s Gazette is looking for utilities, games, applications, educational programs, and tutorial articles. If you've created a program that you think other readers might enjoy or find useful, send it, on tape or disk to:

Submissions Reviewer
COMPUTE! Publications
P.O. Box 5406
Greensboro, NC 27403

Please enclose an SASE if you wish to have the materials returned. Articles are reviewed within four weeks of submission.

bug-swatter

• We have received a number of phone calls and letters concerning the "Pick-A-Letter" program (February 1987). Pick-A-Letter was originally written for the 128, but it will run on the 64 as written—almost. The most common report was that, after several consecutive games, the program stopped with an OUT OF MEMORY ERROR IN LINE 50 message. If you had this problem, you didn't actually run out of memory; you ran out of *stack* space. The stack is the special area of memory where information such as subroutine return addresses are stored. Pick-A-Letter uses a great many FOR-NEXT loops and GOSUBs, both of which eat up stack space quickly. To further compound the problem, the program jumps out of a few GOSUBs without removing the subroutine call information from the stack—not a good programming practice. Because the 128's BASIC stack is four times as large as the 64's, the problem doesn't appear nearly as soon on the 128. However, if you play Pick-A-Letter long enough on the 128, you'll eventually get the same OUT OF MEMORY message as on the 64. The following line corrections and additions fix the problem by exchanging several of the FOR-NEXT loops and GOSUBs with code that accomplishes the same thing without using stack space:

```
AG 10 BO=53280:AC=53281:SC=1024:
      S=54272:FORI=1TO40:SP$=SP$
      +" ":LF$=LF$+"{LEFT}":NEXT
BR 20 FORI=1TO25:DN$=DN$+"{DOWN}
      ":NEXT:FORI=1TO9:READH(I),
      L(I):NEXT
KD 90 FORH=1TO100:NEXT:GOTO50
XP 120 POKES,232:POKES+1,3:FORL=
      1TO100:NEXT:GOTO50
BE 520 PRINT"{39 O}";
AM 550 PRINT"{BLK}{39 U}";
QR 640 NV=0:NN=0:CD$=P$(P%(QQ)):
      CC=P(P%(QQ)):QQ=QQ+1:IFQQ
      >NWTHENQQ=1
PX 730 PRINT"{CYN}Q";:NV=NV+1
PM 760 PRINTLEFT$(SP$,30-LEN(CD$
      ));
BD 780 PRINT"{HOME}"LEFT$(DN$,17
      )TAB(22)"{8}{RVS}"CP
HG 840 IFZ$=" "THEN1040
KJ 930 PRINTLEFT$(LF$,20)K$:GOSU
      B1480:IFUR=1THEN1560
FD 940 GOTO 1180
CH 945 IFN=0THENB(CP)=1:GOTO770
DA 1060 POKES+24,15:POKES+5,128:
      POKES+6,32:POKES,64:POKE
      S+1,156:POKES+4,17
AJ 1065 POKE162,0:WAIT162,2:POKE
      S+4,16
FK 1130 IFV=65THEND=1:C(CP)=0:N=
      0:B(CP)=1:GOTO1250
KA 1140 IFV=88THEND=1:GOSUB700:GO
      SUB700:B(CP)=1:GOTO890
KR 1170 GOTO890
DK 1200 IFMID$(CD$,G,1)=K$THENN=
      N+1:GOSUB800:PRINTK$;:GOT
      O1215
CD 1215 NEXTG:C(CP)=C(CP)+PL*N:G
      OSUB1630
CH 1220 PRINT"{HOME}{4 DOWN}
      {RIGHT}"TAB(10*CP)"{8}
      {4 SPACES}{4 LEFT}"C(CP)
      ;
AP 1230 NN=NN+N:IFNN=NVTHENZX=1:
      GOTO1340
XA 1240 GOTO 945
QJ 1270 NN=NN+N:IFNN=NVTHENZX=1:
      GOTO1340
PM 1280 GOSUB100:GOTO890
CP 1290 PRINT"{HOME}"LEFT$(DN$,2
      1)LEFT$(SP$,39);
EQ 1300 PRINTLEFT$(LF$,39);:INPU
      T "ANSWER";A$
XD 1330 GOSUB700:PRINT"{HOME}
      {4 DOWN}{RIGHT}"TAB(10*C
      P)"{8}{4 SPACES}{4 LEFT}
      "C(CP);
AQ 1332 NN=NN+N:IFNN=NVTHENZX=1:
      GOTO1340
AH 1334 GOTO870
QM 1440 PRINTTAB(10)LEFT$(SP$,29
      );
ES 1500 G=1
BX 1505 IFK$=MID$(RL$,G,1)THENUR
      =1:RETURN
RS 1510 G=G+1:IFG<=RTHEN1505
MB 1530 G=1
FE 1535 IFK$=MID$(UL$,G,1)THENUP
      =1:RETURN
SG 1540 G=G+1:IFG<=UTHEN1535
JP 1560 PRINT"{HOME}"LEFT$(DN$,2
      1)LEFT$(SP$,39);
XD 1570 PRINTLEFT$(LF$,39);
JB 1610 PRINTLEFT$(LF$,25)"{8}
      {2 UP}";
SD 1660 PRINT"{HOME}"LEFT$(DN$,2
      3);
BQ 1690 PRINT"{HOME}"LEFT$(DN$,2
      3);
KB 1740 FORI5=1TO3:FORJ=1TO9:POK
      ES,L(J):POKES+1,H(J):NEX
      T:FORJ=9TO1STEP-1:NEXTJ,
      I5
AQ 1770 PRINT"{40 I}";
XR 1850 IFASC(PA$)=89THENPP=0:GO
      TO260
BQ 1860 PRINT"{CLR}":END
```

In addition to these changes, six lines should be deleted altogether: 60, 130, 140, 650, 660, and 670.

There is one other bug in Pick-A-Letter. As written, the program did not recognize when a word was completed if the word contained a hyphen (-) or an apostrophe ('). The corrections above also fix that problem.

BEFORE TYPING . . .

Before typing in programs, please refer to "How To Type In COMPUTE!'s GAZETTE Programs," which appears before the Program Listings.

Powerball

See instructions in article on page 46 before typing in.

```
C000:4C 65 C8 8D 03 24 8A 48 F8
C008:98 48 AE 03 24 BC 5B CB 84
C010:A9 00 99 04 D4 BD 54 CB EB
C018:99 05 D4 BD 62 CB 99 06 99
C020:D4 BD 69 CB D0 03 AD 1B 6E
C028:D4 99 01 D4 BD 70 CB 99 C8
C030:04 D4 49 01 99 04 D4 68 11
C038:A8 68 AA 60 A9 00 85 FC D8
C040:BD 3D 24 0A 0A 0A 85 FB 94
C048:0A 26 FC 0A 26 FC 18 65 53
C050:FB 85 FB A5 FC 69 00 85 1E
C058:FC A5 FB 18 7D 46 24 85 95
C060:FB 85 FD A9 04 65 FC 85 D0
C068:FC 18 69 D4 85 FE A0 00 52
C070:60 A9 00 8D 02 24 BD 46 C7
C078:24 30 15 CD 47 CD F0 26 11
C080:90 24 AD 47 CD 9D 46 24 13
C088:A9 FF 9D 35 24 4C 98 C0 2A
C090:A9 00 9D 46 24 9D 35 24 25
C098:A9 00 20 03 C0 BD 1D 24 7E
C0A0:20 96 C1 9D 1D 24 BD 3D 1C
C0A8:24 30 16 CD 46 CD 90 27 99
C0B0:EE 02 24 AD 46 CD 9D 3D 6B
C0B8:24 A9 00 9D 2D 24 4C C9 EC
C0C0:C0 A9 00 9D 3D 24 9D 2D C9
C0C8:24 A9 00 20 03 C0 BD 25 84
C0D0:24 20 96 C1 9D 25 24 AD D2
C0D8:02 24 60 20 7A C1 BD 67 30
C0E0:24 9D 3D 24 BD 5F 24 9D 17
C0E8:46 24 BD 57 24 9D 35 24 E9
C0F0:BD 4F 24 9D 2D 24 A9 02 D2
C0F8:4C 03 C0 B1 FB CD 4A CD 0E
C100:F0 08 8A 91 FB A9 00 91 80
C108:FD 60 AD 14 24 C9 07 D0 C0
C110:21 A9 20 91 FB B1 FD 29 77
C118:0F CD 48 CD D0 0A A9 02 80
C120:20 03 C0 A9 01 4C 8C C4 3E
C128:A9 01 20 03 C0 A9 03 4C F3
C130:68 C4 B1 FD 29 0F CD 48 98
C138:CD F0 A0 CD 49 CD F0 1F 52
C140:AD 49 CD 91 FD AD 1B D4 71
C148:30 08 29 0F C9 02 90 F5 69
C150:91 FD A9 01 20 8C C4 A9 C7
C158:01 20 03 C0 4C 7A C1 A9 4A
C160:20 91 FB A9 04 20 68 C4 A8
C168:AD 1B D4 C9 C0 B0 03 20 AF
C170:0E C3 A9 01 20 03 C0 4C 0C
C178:7A C1 BD 3D 24 DD 67 24 C0
C180:D0 0A BD 1D 24 20 96 C1 09
C188:9D 1D 24 60 BD 25 24 20 97
C190:96 C1 9D 25 24 60 49 FF 0B
C198:85 02 E6 02 A5 02 60 98 EA
C1A0:48 BC 1D 24 30 0D C8 CC 71
C1A8:40 CD B0 11 98 9D 1D 24 80
C1B0:4C BD C1 88 CC 41 CD 90 22
C1B8:04 98 9D 1D 24 68 A8 60 5E
C1C0:BD 1D 24 30 04 DE 1D 24 EB
C1C8:60 FE 1D 24 60 98 48 BC D4
C1D0:25 24 30 0D C8 CC 40 CD 8E
C1D8:B0 11 98 9D 25 24 4C EB 24
C1E0:C1 88 CC 41 CD 90 04 98 66
C1E8:9D 25 24 68 A8 60 BC 25 F4
C1F0:24 30 0A 88 C0 02 F0 0F 5B
C1F8:98 9D 25 24 60 C8 C0 FE BD
C200:F0 05 98 9D 25 24 60 60 07
C208:20 86 C2 F0 01 60 A9 20 A3
C210:91 FB AD 18 24 9D 15 24 7A
C218:F0 0E AD 44 24 9D 3D 24 C9
C220:DE 3D 24 A9 F0 9D 2D 24 FF
C228:A9 00 BD 25 24 30 03 20 94
C230:96 C1 9D 25 24 BD 1D 24 ED
C238:10 03 20 96 C1 9D 1D 24 D6
C240:AD 04 24 38 ED 05 24 10 81
C248:03 20 96 C1 8D 06 24 AD C0
C250:04 24 CD 05 24 F0 04 B0 88
C258:13 90 08 BD 35 24 CD 3C 7A
C260:24 B0 09 BD 1D 24 20 96 71
C268:C1 9D 1D 24 AD 06 24 CD B7
C270:72 24 B0 06 20 CD C1 4C B6
C278:C0 C1 CD 73 24 90 06 20 4F
C280:EE C1 4C 9F C1 60 BD 3D B9
C288:24 CD 44 24 F0 01 60 BD 68
C290:35 24 8D 06 24 AD 3C 24 40
C298:8D 07 24 BD 46 24 0E 06 EB
C2A0:24 2A 0E 06 24 2A 8D 04 CD
C2A8:24 AD 4D 24 0E 07 24 2A 96
C2B0:0E 07 24 2A 18 6D 75 24 AB
C2B8:8D 05 24 AD 05 24 38 ED BC
C2C0:04 24 10 03 20 96 C1 CD 30
C2C8:74 24 B0 03 A9 00 60 A9 8F
C2D0:01 60 A9 00 9D 3D 24 9D EB
C2D8:2D 24 AD 1B D4 CD 47 CD 9F
C2E0:B0 F8 9D 46 24 AD 1B D4 F7
C2E8:C9 E0 90 03 20 0E C3 AD 3C
C2F0:1B D4 29 0F CD 1C 24 B0 27
C2F8:F6 9D 25 24 FE 25 24 AD CA
C300:1B D4 29 1F 4A 90 03 20 1C
C308:96 C1 9D 1D 24 60 AD 12 E0
C310:24 10 01 60 8A 48 98 48 C2
C318:A9 00 8D 23 24 AD 42 CD 82
C320:4A 8D 2B 24 BD 46 24 8D B4
C328:4C 24 BD 3D 24 8D 43 24 6C
C330:A9 80 8D 3B 24 8D 33 24 F3
C338:8D 12 24 AD 1B D4 29 07 EF
C340:CD 13 24 F0 F6 AA AD 1B DF
C348:D4 DD 38 CD B0 ED 8E 13 03
C350:24 BD 30 CD 8D 2D D0 A5 A4
C358:FB 48 A5 FC 48 A9 E0 85 A4
C360:FB A9 CC 85 FC AD 13 24 2B
C368:0A 0A 0A 18 65 FB 85 FB 5C
C370:A5 FC 69 00 85 FC A0 00 98
C378:A2 28 B1 FB 9D 00 20 E8 67
C380:E8 E8 C8 C0 08 D0 F3 68 AF
C388:85 FC 68 85 FB 68 A8 68 B2
C390:AA 60 BD 46 24 9D 5F 24 1C
C398:BD 3D 24 9D 67 24 BD 35 29
C3A0:24 9D 57 24 BD 2D 24 9D 57
C3A8:4F 24 BD 1D 24 18 7D 35 1C
C3B0:24 9D 35 24 BD 1D 24 30 75
C3B8:0B BD 46 24 69 00 9D 46 0D
C3C0:24 4C CC C3 BD 46 24 E9 7C
C3C8:00 9D 46 24 BD 25 24 18 A5
C3D0:7D 2D 24 9D 2D 24 BD 25 5B
C3D8:24 30 0B BD 3D 24 69 00 09
C3E0:9D 3D 24 4C EE C3 BD 3D 0F
C3E8:24 E9 00 9D 3D 24 60 AD BF
C3F0:00 DC 8D 00 24 29 04 D0 FF
C3F8:09 AD 45 CD 8D 24 24 4C 87
C400:17 C4 AD 00 24 29 08 D0 A2
C408:09 AD 44 CD 8D 24 24 4C 78
C410:17 C4 A9 00 8D 24 24 AD 7E
C418:00 24 29 10 D0 2E A9 00 63
C420:8D 15 24 8D 16 24 8D 17 86
C428:24 AD 14 24 C9 04 D0 1C 10
C430:AE 4E CD BD 3D 24 10 0F E3
C438:AD 4D 24 9D 46 24 AD 44 AC
C440:24 9D 3D 24 DE 3D 24 CA 2C
C448:E0 07 D0 E7 A2 07 20 92 A0
C450:C3 AD 24 24 8D 00 24 20 C2
C458:71 C0 AD 24 24 CD 00 24 3F
C460:F0 05 A9 00 8D 24 24 60 7E
C468:CE 1A 24 D0 1F AD 1B 24 7B
C470:D0 17 8D 6F 24 AD 1C 24 05
C478:8D 02 24 A9 64 20 8C C4 E9
C480:CE 02 24 10 F6 EE 1C 24 47
C488:60 CE 1B 24 8D 00 24 8A DA
C490:48 98 48 A2 05 AD B0 07 DE
C498:18 6D 00 24 8D B0 07 A9 B2
C4A0:00 8D 01 24 BD AB 07 C9 64
C4A8:3A 90 0D EE 01 24 38 E9 F6
C4B0:0A C9 3A B0 F6 9D AB 07 90
C4B8:CA BD AB 07 18 6D 01 24 99
C4C0:9D AB 07 E0 FF D0 D8 68 50
C4C8:A8 68 AA 60 A2 08 AD 45 F1
C4D0:24 10 03 4C 37 C9 20 3C F2
C4D8:C0 A9 20 91 FB CE 45 24 14
C4E0:30 46 20 3C C0 B1 FB CD 6E
C4E8:4A CD F0 0B AD 4C CD 91 A5
C4F0:FB AD 4D CD 91 FD 60 A9 59
C4F8:FF 8D 45 24 B1 FD 29 0F B7
C500:CD 48 CD F0 23 CD 49 CD FD
C508:D0 0E A9 20 91 FB A9 01 87
C510:20 03 C0 A9 03 4C 68 C4 FD
C518:AD 1B D4 29 0F C9 02 90 A2
C520:F7 91 FD A9 06 4C 03 C0 8E
C528:A9 02 4C 03 C0 AD 43 24 2A
C530:10 03 4C 37 C9 A2 06 20 86
C538:92 C3 20 71 C0 F0 0B A9 A2
C540:00 8D 12 24 A9 FF 8D 43 5F
C548:24 60 20 86 C2 D0 03 4C 16
C550:8C C5 60 BD 46 24 8D 46 9F
C558:24 8D 47 24 8D 48 24 BD 18
C560:3D 24 8D 3D 24 8D 3E 24 11
C568:8D 3F 24 BD 1D 24 8D 1D 9C
C570:24 8D 1E 24 20 96 C1 8D E3
C578:1F 24 BD 25 24 8D 25 24 6C
C580:8D 27 24 20 96 C1 8D 26 20
C588:24 A9 00 60 8A 48 98 48 85
C590:A9 00 8D 12 24 A2 03 9D 13
C598:15 24 CA 10 FA AD 14 24 EC
C5A0:AA E0 02 D0 32 A9 00 8D CC
C5A8:75 24 4E 72 24 4E 73 24 4E
C5B0:4E 74 24 AD 3C 24 18 69 EB
C5B8:80 8D 3C 24 AD 4D 24 69 06
C5C0:01 8D 4D 24 A2 07 20 71 FE
C5C8:C0 A9 00 8D 24 24 AD 2F 34
C5D0:CD 2D 1D D0 8D 1D D0 A9 6B
C5D8:04 20 03 C0 AD 13 24 AA 87
C5E0:BD 30 CD 8D 2E D0 E0 00 60
C5E8:D0 24 A2 02 AD 42 CD BC 29
C5F0:25 24 10 03 AD 43 CD 9D FD
C5F8:25 24 AD 42 CD BC 1D 24 B9
C600:10 03 AD 43 CD 9D 1D 24 83
C608:CA 10 E1 4C C3 C6 E0 01 FB
C610:D0 16 A9 64 8D 18 24 4C 68
C618:C3 C6 A9 00 8D 15 24 8D 05
C620:16 24 8D 17 24 4C C3 C6 85
C628:E0 02 D0 35 AD 27 CD 0D C6
C630:1D D0 8D 1D D0 0E 72 24 CB
C638:0E 73 24 0E 74 24 A9 06 9C
C640:8D 75 24 AD 3C 24 38 E9 1E
C648:81 8D 3C 24 AD 4D 24 E9 98
C650:01 8D 4D 24 A2 07 20 71 90
C658:C0 A9 00 8D 24 24 4C C3 97
C660:C6 E0 03 D0 23 A2 00 BD 58
C668:3D 24 10 07 E8 BD 3D 24 EC
C670:10 01 E8 AD 4B CD C9 01 64
C678:F0 03 4C C3 C6 20 53 C5 28
C680:A9 03 8D 4B CD 4C C3 C6 F7
C688:E0 04 D0 03 4C C3 C6 E0 B1
C690:05 D0 15 AD 1C 24 C9 0A 61
C698:F0 0B A9 00 8D 6F 24 EE F7
C6A0:1C 24 4E 3D CD 4C C3 C6 D0
C6A8:E0 06 D0 13 AD A1 07 C9 3F
C6B0:39 F0 09 EE A1 07 4E 3E 2B
C6B8:CD 4C C3 C6 4C C3 C6 E0 05
C6C0:07 D0 00 A9 FF 8D 43 24 81
C6C8:AD 13 24 8D 14 24 68 A8 F9
C6D0:68 AA 60 A2 07 A0 0E BD 08
C6D8:3D 24 10 0C BD 28 CD 2D 28
C6E0:15 D0 8D 15 D0 4C 40 C7 30
C6E8:BD 20 CD 0D 15 D0 8D 15 04
C6F0:D0 BD 2D 24 8D 00 24 BD B0
C6F8:3D 24 0E 00 24 2A 0E 00 D5
C700:24 2A 0E 00 24 2A 69 29 B3
C708:99 01 D0 BD 35 24 8D 00 EF
C710:24 BD 46 24 0E 00 24 2A 0F
C718:0E 00 24 2A 18 69 07 8D D7
C720:01 24 0E 00 24 2A 99 00 F7
C728:D0 90 0C BD 20 CD 0D 10 04
C730:D0 8D 10 D0 4C 40 C7 BD 4B
C738:28 CD 2D 10 D0 8D 10 D0 A3
C740:88 88 CA 10 92 60 A2 02 ED
C748:CE 0A 24 D0 09 CE 0B 24 11
C750:AD 0C 24 8D 0A 24 BD 3D B0
```

```
C758:24 30 06 20 81 C7 4C 64 F0
C760:C7 20 37 C9 CA 10 EF AD 83
C768:0B 24 10 09 4E 0D 24 AD B5
C770:0D 24 8D 0B 24 60 AD 1B 0B
C778:D4 10 03 4C 9F C1 4C CD 06
C780:C1 AD 0B 24 10 03 20 76 43
C788:C7 20 3C C0 B1 FB 8D 00 30
C790:24 EC 00 24 D0 04 A9 20 B9
C798:91 FB BD 15 24 F0 2F BD F9
C7A0:1D 24 48 BD 25 24 48 A9 A0
C7A8:00 9D 25 24 AD 24 24 9D 6A
C7B0:1D 24 20 92 C3 20 71 C0 47
C7B8:68 9D 25 24 68 9D 1D 24 E2
C7C0:CE 19 24 AD 19 24 29 03 0C
C7C8:D0 03 DE 15 24 60 20 92 24
C7D0:C3 20 71 C0 F0 09 A9 FF 83
C7D8:9D 3D 24 CE 4B CD 60 20 6A
C7E0:3C C0 20 FB C0 20 08 C2 DB
C7E8:60 A0 00 A2 05 BD 3D 24 B8
C7F0:10 03 20 D2 C2 20 92 C3 F9
C7F8:20 71 C0 F0 08 20 76 C7 91
C800:A9 05 20 03 C0 AD 1B D4 A3
C808:F0 16 C9 0F B0 12 9D 27 F1
C810:D0 FE F8 07 BD F8 07 C9 03
C818:86 D0 05 A9 83 9D F8 07 E7
C820:20 86 C2 F0 1B 20 3C C0 5D
C828:B1 FB CD 4C CD F0 11 C9 2E
C830:02 B0 1C 8E 00 24 AA 20 61
C838:7A C1 20 76 C7 AE 00 24 FF
C840:A9 03 20 03 C0 A9 FF 9D E5
C848:3D 24 A9 01 20 8C C4 CA 4E
C850:E0 02 D0 99 60 A9 CD 8D 59
C858:73 C9 A9 CB 8D 74 C9 A9 83
C860:01 8D 1C 24 60 A9 93 20 8C
C868:D2 FF 20 55 C8 20 B8 CA BF
C870:A9 0F 8D 86 02 A9 00 8D F8
C878:21 D0 A9 26 8D 00 24 A0 BB
C880:00 AE 46 CD E8 18 20 F0 3C
C888:FF A2 00 BD 83 CB 20 D2 FC
C890:FF E8 EC 00 24 D0 F4 20 68
C898:F9 CA 20 EF C3 20 46 C7 CF
C8A0:20 2D C5 20 E9 C7 20 CC C3
C8A8:C4 AD 8D 02 29 01 D0 F9 C2
C8B0:20 D3 C6 20 34 CB D0 E2 77
C8B8:A0 01 A2 0C 18 20 F0 FF 13
C8C0:A2 00 BD A9 CB 20 D2 FF 7A
C8C8:E8 E0 24 D0 F5 20 24 C9 DA
C8D0:AD 70 24 8D 73 C9 AD 71 42
C8D8:24 8D 74 C9 A9 30 8D 3D 71
C8E0:CD A5 A2 8D 08 24 CE 08 66
C8E8:24 A5 A2 CD 08 24 F0 09 E2
C8F0:AD 00 DC 29 10 F0 05 D0 A6
C8F8:F0 20 55 C8 A2 00 BD AB 7E
C900:07 DD B8 07 F0 04 90 14 E2
C908:B0 07 E8 E0 06 D0 EF F0 25
C910:0B A2 05 BD AB 07 9D B8 BB
C918:07 CA 10 F7 A9 1B 8D 00 38
C920:24 4C 7F C8 A5 A2 69 3C 1C
C928:8D 08 24 A5 A2 CD 08 24 E3
C930:D0 F9 A9 04 4C 03 C0 A9 B9
C938:DC 8D 08 24 EE 08 24 D0 91
C940:FB 60 A9 00 85 FB 85 FD 44
C948:8D 1A 24 8D 1B 24 A0 00 31
C950:A9 20 99 00 04 99 00 05 7F
C958:99 00 06 88 D0 F4 AD 73 2B
C960:C9 8D 70 24 AD 74 C9 8D EC
C968:71 24 A9 04 85 FC A9 D8 7F
C970:85 FE AD CD CB C9 03 90 35
C978:0F EE 73 C9 D0 03 EE 74 3F
C980:C9 20 98 C9 90 EC B0 0D 57
C988:C9 00 F0 09 EE 73 C9 D0 59
C990:03 EE 74 C9 60 4C 55 C8 34
C998:8D 00 24 29 03 AA 4E 00 69
C9A0:24 4E 00 24 E0 02 90 12 5E
C9A8:AD 1A 24 18 6D 00 24 8D E0
C9B0:1A 24 AD 1B 24 69 00 8D 16
C9B8:1B 24 BD 5F CD 91 FB BD FA
C9C0:63 CD 91 FD C8 D0 0B E6 12
C9C8:FC E6 FE A5 FC C9 07 90 7C
C9D0:01 60 CE 00 24 D0 E3 60 63
C9D8:A0 18 A9 00 99 00 D4 88 F6
C9E0:10 FA A9 0F 8D 18 D4 A2 7A
C9E8:07 A9 FF 8D 0F D4 A9 80 E2
C9F0:8D 12 D4 A2 07 BD 3D 24 62
C9F8:30 11 20 3C C0 B1 FB 8D 03
CA00:00 24 EC 00 24 D0 04 A9 52
CA08:20 91 FB CA 10 E7 AD 45 FE
CA10:24 30 10 A2 08 20 3C C0 E9
CA18:B1 FB CD 4C CD D0 04 A9 67
CA20:20 91 FB A9 FF 8D 14 24 C6
CA28:8D 45 24 8D 15 24 A9 FA BA
CA30:8D 0C 24 A9 30 8D 0D 24 A4
CA38:8D 0B 24 A2 07 BD 4F CD A1
CA40:9D F8 07 A9 FF 9D 3D 24 73
CA48:BD 57 CD 9D 27 D0 CA 10 48
CA50:EC AC 46 CD 88 8C 44 24 50
CA58:88 8C 3D 24 A9 01 8D 72 1E
CA60:24 A9 05 8D 73 24 A9 06 71
CA68:8D 74 24 A9 00 8D 75 24 46
CA70:8D 1D D0 AD 47 CD 4A 8D 9C
CA78:46 24 8D 4D 24 A9 00 8D 16
CA80:12 24 8D 18 24 8D 3C 24 4F
CA88:8D 35 24 8D 34 24 8D 24 01
CA90:24 8D 2C 24 A9 F0 8D 2D BC
CA98:24 A9 01 8D 4B CD AD 42 D2
CAA0:CD 18 6D 1C 24 8D 1D 24 48
CAA8:AD 43 CD 38 ED 1C 24 8D D8
CAB0:25 24 20 D3 C6 4C 24 C9 9C
CAB8:A2 00 A9 00 9D 00 20 9D 9F
CAC0:00 21 CA D0 F7 A9 FF A2 0E
CAC8:27 A0 00 9D 00 20 9D 40 EF
CAD0:20 E8 E0 40 D0 F5 A2 16 8A
CAD8:B9 78 CB 9D 80 20 AD 80 1D
CAE0:CB 9D C0 20 AD 81 CB 9D 86
CAE8:00 21 AD 82 CB 9D 40 21 1B
CAF0:E8 E8 E8 C8 C0 08 D0 E0 87
CAF8:60 A9 80 8D 3E CD A2 27 A7
CB00:BD 98 07 9D 76 24 CA 10 41
CB08:F7 A9 93 20 D2 FF A2 27 7D
CB10:BD 76 24 9D 98 07 AD 86 45
CB18:02 9D 98 DB CA 10 F1 A9 0D
CB20:01 8D 6F 24 A2 08 A9 FF 54
CB28:9D 3D 24 CA 10 F8 20 42 F5
CB30:C9 4C D8 C9 AD 6F 24 D0 BB
CB38:06 20 F9 CA 4C 51 CB AD B3
CB40:4B CD D0 0D CE A1 07 AD 94
CB48:A1 07 C9 30 F0 05 20 D8 63
CB50:C9 A9 01 60 D5 00 00 2A 36
CB58:A9 2A 41 07 07 07 00 00 3C
CB60:00 00 F3 F3 F3 03 00 03 64
CB68:03 0B 1E 46 0A 09 00 00 E0
CB70:11 11 11 80 20 10 10 10 70
CB78:00 00 1C 3E 3E 1C 00 00 D9
CB80:1F F8 10 20 50 41 44 44 3E
CB88:4C 45 53 20 34 20 20 20 86
CB90:53 43 4F 52 45 20 30 30 EC
CB98:30 30 30 30 20 20 48 49 B8
CBA0:47 48 20 30 30 30 30 30 C7
CBA8:30 50 52 45 53 53 20 46 79
CBB0:49 52 45 20 54 4F 20 43 8F
CBB8:4F 4E 54 49 4E 55 45 20 1D
CBC0:41 54 20 54 48 49 53 20 85
CBC8:4C 45 56 45 4C A0 F3 F3 B7
CBD0:A0 A3 A3 01 F0 53 3C 53 C6
CBD8:3C 53 3C 53 3C 53 50 A2 92
CBE0:01 A0 F3 F3 F3 F3 A4 99 31
CBE8:01 A0 F2 F2 A0 A2 A0 A2 2A
CBF0:A0 A2 01 A0 4B 10 93 10 7D
CBF8:93 10 93 10 4B 49 12 49 BE
CC00:01 A0 DF 11 0B 11 7B 11 F3
CC08:0B 11 DF 4F 09 EF 43 21 0C
CC10:87 19 E7 01 A0 A3 91 C0 38
CC18:A3 91 A0 A3 91 01 D8 32 AA
CC20:68 43 58 51 50 53 50 51 A0
CC28:5C 3A 01 A1 F2 F2 A1 F3 53
CC30:F3 A1 27 05 27 05 27 05 02
CC38:2B A1 01 50 05 9C 05 9C 36
CC40:05 08 05 74 05 14 05 07 CF
CC48:05 04 05 14 05 07 54 05 39
CC50:06 05 0C 11 04 05 14 05 22
CC58:13 48 05 06 05 08 09 0A F2
CC60:11 10 05 28 06 04 06 04 F9
CC68:06 18 1D 06 09 06 0D 0F 98
CC70:04 05 14 06 04 06 04 1A 8A
CC78:14 3D 0F 04 05 14 1E 04 46
CC80:0A 14 09 0F 11 0A 0D 17 18
CC88:05 14 0A 04 12 04 0A 14 F3
CC90:09 0F 11 0A 0D 17 05 14 18
CC98:0A 04 1E 08 0E 09 07 0E 2D
CCA0:0B 12 09 0E 0B 05 0E 08 D6
CCA8:FE 11 6A 05 06 05 06 05 F8
CCB0:06 05 0A 05 13 05 0A 05 E5
CCB8:06 05 06 05 06 05 42 05 75
CCC0:06 05 06 05 06 05 0A 05 0D
CCC8:13 05 0A 05 06 05 06 05 14
CCD0:06 05 66 05 13 05 8A 05 92
CCD8:13 05 8A 05 13 05 46 00 18
CCE0:C3 99 9F C3 F9 99 C3 FF B0
CCE8:C3 99 9F 9F 9F 99 C3 FF A3
CCF0:9F 9F 9F 9F 9F 9F 81 FF AE
CCF8:C3 99 F9 E3 F9 99 C3 FF 16
CD00:81 9F 9F 87 9F 9F 9F FF 6B
CD08:99 89 81 81 91 99 99 FF 41
CD10:FF 99 C3 00 C3 99 FF FF 0F
CD18:83 99 99 83 9F 9F 9F FF 02
CD20:01 02 04 08 10 20 40 80 BF
CD28:FE FD FB F7 EF DF BF 7F BF
CD30:07 05 06 0E 02 0A 0C 04 86
CD38:C0 FF FF FF FF 30 60 FF B5
CD40:23 DD 08 F8 2D D3 16 27 81
CD48:01 05 FA 01 1E 0F 09 82 D6
CD50:82 82 83 83 83 80 81 01 98
CD58:01 01 04 07 0D 01 01 20 34
CD60:FA FA FA 00 01 0C 05 00 D9
```

BEFORE TYPING . . .

Before typing in programs, please refer to "How To Type In COMPUTE!'s GAZETTE Programs," which appears before the Program Listings.

Unscramble

Article on page 44.

```
QE 10 POKE53281,0:POKE53280,6:
      CO=54272:SC=1024:NDX=198
      :REM NDX=208 ON THE 128
GA 20 POKECO+24,15:POKECO+5,17
      :POKECO+6,240:POKECO,100
FC 30 X=RND(-TI):DIMA$(40),B$(
      40),TE(40)
EP 40 FOR I=0 TO 9:READ NU$(I)
      :NEXT:DATA 00,01,02,03,0
      4,05,06,07,08,09
FE 50 FOR I=1 TO 5:READ FF$(I)
      :NEXT:DATA FIRST,SECOND,
      THIRD,FOURTH,FIFTH
BG 60 PRINT"{CLR}{YEL}":D$="
      {23 SPACES}"
EH 70 PRINTSPC(14)"{2 DOWN}{8}
      UNSCRAMBLE":PRINTSPC(14)
      "{10 T}"
JM 80 FOR I=0 TO 1:PRINT SPC(1
      1)"{3 DOWN}{7}PLAYER #"R
      IGHT$(NU$(I+1),1)"'S NAM
      E"
KK 90 PRINTSPC(11);:INPUT P$(I
      ):IF P$(I)="" THEN PRINT
      "{2 UP}":GOTO90
JA 100 P$(I)=LEFT$(P$(I),10):N
       EXT
KK 110 PRINT"{CLR}{DOWN}":POKE
       NDX,0:FOR I=1 TO 5:W$(I
       )="":NEXT
MC 120 PRINT"{3 SPACES}{RVS}
       {8}"P$(C)
EB 130 FOR I=1 TO 5
JE 140 PRINT"{DOWN}{3 SPACES}
       {YEL}ENTER {RVS}"FF$(I)
       "{OFF} WORD TO BE SCRAM
       BLED{OFF}"
BG 150 PRINT"{3 SPACES}";:INPU
       TW$(I):IFW$(I)=""THENPR
       INT"{UP}";:GOTO150
```

```
JA 160 W$(I)=LEFT$(W$(I),15):F
       ORP=1TOLEN(W$(I))
JM 170 IFMID$(W$(I),P,1)<"A"OR
       MID$(W$(I),P,1)>"Z"THEN
       P=LEN(W$(I)):NEXT:GOTO1
       40
HA 180 NEXT:NEXT:PRINT"
       {2 DOWN}{8}{9 SPACES}SC
       RAMBLING THE WORDS..."
XJ 190 GOSUB210:GOSUB330:GOSUB
       580
EM 200 FOR I=1 TO 10:B$(I)="":
       NEXT:GOTO110
KC 210 FOR I=1 TO 5:R$(I)="":N
       EXT:FOR MT=1 TO 5:UPS=L
       EN(W$(MT))
CA 220 FOR I=1 TO UPS:TE(I)=1:
       NEXT
XK 230 FOR I=1 TO UPS
BJ 240 XX=INT(UPS*RND(1))+1:IF
        TE(XX)=0 THEN240
BP 250 B$(I)=MID$(W$(MT),XX,1)
       :TE(XX)=0:NEXT:R$(MT)="
       "
JG 260 FOR I=1 TO UPS:R$(MT)=R
       $(MT)+B$(I)
DH 270 NEXT:IF R$(MT)=W$(MT) A
       ND LEN(W$(MT))>1 THEN22
       0
SD 280 NEXT
PE 290 PRINT"{CLR}{2 DOWN}{UP}
       {9 SPACES}WORDS ARE SCR
       AMBLED {DOWN}":QQ=-Q+1:
       SP=LEN(P$(QQ))+24:SP=SP
       /2
EG 300 PS=19-SP:PRINT SPC(PS)
       {SPACE}P$(QQ)", PRESS A
       NY KEY TO BEGIN{HOME}":
       GOSUB670
JG 310 POKENDX,0:WAITNDX,1:GET
       A$
CQ 320 PRINT"{CLR}":RETURN
KF 330 FOR MT=1 TO 5:CS=-C+1:S
       P=INT(LEN(P$(CS))/2)
MM 340 PS=19-SP:PRINT"{HOME}
       {6 DOWN}"SPC(11)D$"
       {DOWN}":PRINTSPC(11)D$:
       PRINTSPC(11)D$
DP 350 PRINT"{HOME}{2 DOWN}"SP
       C(PS)"{RVS}"P$(CS):SP=I
       NT(LEN(R$(MT))/2):PS=19
       -SP
DC 360 PRINT"{3 DOWN}{YEL}"SPC
       (PS) R$(MT)
GQ 370 FOR J=1 TO LEN(W$(MT)):
       A$(J)=MID$(W$(MT),J,1):
       NEXT
DQ 380 Z=SC+360+PS:CC=Z+CO:X=P
       S:FOR I=1 TO LEN(W$(MT)
       ):POKE Z,99:POKE CC,1
MJ 390 GET R$:TM=TM+.06:IF INT
       (TM)> 59 THEN MI=MI+1:T
       M=INT(TM)-60
QD 400 IF MI>9 THEN TT$=STR$(M
       I):MI$=RIGHT$(TT$,2):GO
       TO420
MB 410 MI$=NU$(MI)
QQ 420 IF TM>=10 THEN TT$=STR$
       (INT(TM)):TM$=RIGHT$(TT
       $,2):GOTO440
MQ 430 TM$=NU$(TM)
ED 440 PRINT"{HOME}{20 DOWN}"S
       PC(17)"{YEL}WORD"MT
RK 450 PRINT"{HOME}{8}"SPC(17)
       MI$":"TM$:IF R$="" THEN
       390
XJ 460 PRINT"{6 DOWN}"
SE 470 IF R$=A$(I) THEN PRINT
       {SPACE}TAB(X)A$(I);:PA=
       50:UPS=50:GOSUB660:GOTO
       490:STOP
RK 480 TM=TM+10:PA=20:UPS=120:
       GOSUB660:GOTO390
DP 490 Z=Z+1:X=X+1:CC=CC+1:NEX
       T:NEXT MT:PRINT:PRINT"
       {3 DOWN}":Q=-C+1
FC 500 SP=LEN(P$(Q))+19:SP=INT
       (SP/2):PS=19-SP
MF 510 PRINT SPC(PS)"{7}TOTAL
       {SPACE}TIME FOR {RVS}"P
       $(Q)"{OFF} WAS{DOWN}":S
       P=14:MI=VAL(MI$)
MA 520 PRINT SPC(SP);:IF MI>0
       {SPACE}THEN PRINT"
       {5 LEFT}" MI"MINUTE";
RD 530 IF MI>1 THEN PRINT"S";
XS 540 IF MI>0 THEN PRINT" AND
       ";
JC 550 TM=VAL(TM$):PRINT TM"SE
       COND";:IF TM>1 THEN PRI
       NT"S"
BP 560 PRINT"{HOME}{20 DOWN}"S
       PC(17)"{6 SPACES}"
JK 570 FOR I=1 TO 3000:NEXT:SO
       (Q)=MI*100+TM:SO$(Q)=MI
       $+":"+TM$:TM=0:MI=0:RET
       URN
CE 580 IFC<>1THENC=1:RETURN
DC 590 PRINT"{CLR}{5 DOWN}{8}
       {14 SPACES}FINAL SCORES
       ":PRINT SPC(14)"{12 T}
       {2 DOWN}"
EC 600 PRINTSPC(11)P$(0)TAB(23
       )SO$(0):PRINT"{2 DOWN}"
       SPC(11)P$(1)TAB(23)SO$(
       1)
KJ 610 PRINT"{2 DOWN}":WN$=P$(
       0):IF SO(0)=SO(1) THEN
       {SPACE}PRINT SPC(14)"IT
       'S{2 SPACES}A TIE":GOTO
       640
XE 620 IF SO(1)<SO(0) THEN WN$
       =P$(1)
RG 630 PRINT"{11 SPACES}{RVS}"
       WN$" IS THE WINNER
       {2 DOWN}"
GE 640 PRINT"{2 DOWN}
       {7 SPACES}PRESS ANY KEY
        TO PLAY AGAIN"
MG 650 WAITNDX,1:GETA$:RUN
CH 660 POKE CO+1,PA:POKE CO+4,
       33:FOR QQ=1 TO UPS:NEXT
       :POKE CO+4,32:RETURN
RC 670 FOR PA=40 TO 20 STEP-1:
       UPS=20:GOSUB660:NEXT:FO
       R I=1 TO 500:NEXT:RETUR
       N
```

Fast Boot

Article on page 89.

Program 1: Fast Boot ML Maker

```
EX 10  REM M/L PROGRAMS FOR FAS
       TBOOT-64
SF 30  :
MP 40  PRINT"{CLR}"TAB(81)"THIS
        PROGRAM WILL SAVE FOUR"
QX 50  PRINT" M/L PROGRAMS TO D
       ISK -- BE SURE"
EA 60  PRINT" THE DISK YOU USE
       {SPACE}IS THE SAME AS"
HS 70  PRINT" THE ONE WITH FAST
       BOOT-64!"
EE 80  PRINT:PRINT" HIT SPACE B
       AR TO CONTINUE"
DK 90  GETKEY ZZ$:IF ZZ$<>" " T
       HEN 90
CQ 100 AD=49152:EA=49178:GOSUB
        310
XD 110 READ DA:DA=DA/137:POKE
       {SPACE}AD,DA:AD=AD+1
GC 120 EA=49197:GOSUB 310
GC 130 READ DA:DA=DA/55:POKE A
       D,DA:AD=AD+1
AX 140 EA=49241:GOSUB 310
QF 150 PN$="FAST LOAD M/L":GOS
       UB 330
HP 160 :
CA 170 POKE 49179,137:POKE 491
       98,55:AD=49242
RR 180 RESTORE 510:EA=AD+38:GO
       SUB 310
FJ 190 PN$="FAST RUN M/L":GOSU
       B 330
AR 200 :
MA 210 RESTORE 570:AD=49171:EA
       =AD+61:GOSUB 310
XD 220 READ DA:DA=DA/203:POKE
       {SPACE}AD,DA:AD=AD+1
XM 230 EA=AD+17:GOSUB 310:READ
        DA:DA=DA/43:POKE AD,DA
       :AD=AD+1
HX 240 EA=AD+69:GOSUB 310:PN$=
       "FAST LOAD BASIC":GOSUB
        330
RA 250 :
FM 260 AD=49171+62:POKE AD,203
       :AD=AD+19:POKE AD,43
FM 270 AD=AD+71:EA=AD+23:RESTO
       RE 780:GOSUB 310
JJ 280 PN$="FAST RUN BASIC":GO
       SUB 330
SJ 290 END
ED 300 :
BP 310 DO UNTIL AD=EA+1:READ D
       A:POKE AD,DA:AD=AD+1:LO
       OP:RETURN
QE 320 :
QP 330 RESTORE 830:EA=EA+8:GOS
       UB 310
JX 340 BSAVE(PN$),B0,P49152 TO
        P(AD)
PQ 350 RETURN
QH 360 :
GA 370 DATA 169,3,141,48,208,1
       62,0,189
GH 380 DATA 144,1,157,0,128,23
       2,224,9
EG 390 DATA 208,245,169
XK 400 :
GG 410 DATA 48,133,95,169,4,13
       3,96,169
JM 420 DATA 13426,133,90,169,4
MP 430 DATA 133,91,169,144,133
       ,88,169,1
FG 440 DATA 133,89,32,191,163,
       76,5170,1
XJ 450 DATA 162,1,142,22,208,3
       2,163,253
QH 460 DATA 32,80,253,32,21,25
       3,32,91
CQ 470 DATA 255,88,32,83,228,3
       2,191,227
BD 480 DATA 32,34,228,162,251,
       154,173,153
PG 490 DATA 1,141,17,3,173,154
       ,1,141,18,3
FA 500 :
DS 510 DATA 169,83,141,119,2,1
       69
FE 520 DATA 89,141,120,2,169,8
       3,141,121
JB 530 DATA 2,169,55,141,122,
       ,169,56
FE 540 DATA 141,123,2,169,52,1
       41,124,2
PJ 550 DATA 169,13,141,125,2,1
       69,7,133,198
RE 560 :
XC 570 DATA 1,133,25,169,32
XF 580 DATA 133,26,169,1,133,2
       7,133,43
KK 590 DATA 169,8,133,44,133,2
       8,174,154
EM 600 DATA 1,240,16,160,0,177
       ,25,145
```

```
JR 610 DATA 27,200,208,249,230
       ,26,230,28
GX 620 DATA 202,208,242,174,15
       3,1,240,8
SH 630 DATA 177,25,145,27,200,
       202,208,248
KP 640 DATA 169,102,133,95,169
       ,4,133,96
DR 650 DATA 169,36337,133,90,1
       69,4,133,91
BD 660 DATA 169,144,133,88,169
       ,1,133,89
HM 670 DATA 32,191,163,76,2881
       ,1,162,1
QJ 680 DATA 142,22,208,32,163,
       253,32,80
AH 690 DATA 253,32,21,253,32,9
       1,255,88
FK 700 DATA 32,83,228,32,191,2
       27,173,1
KQ 710 DATA 8,141,144,1,173,2,
       8,141
BG 720 DATA 145,1,32,34,228,17
       3,144,1
HH 730 DATA 141,1,8,173,145,1,
       141,2
QX 740 DATA 8,162,251,154,24,1
       73,153,1
QF 750 DATA 101,43,133,45,173,
       154,1,101
ME 760 DATA 44,133,46
MB 770 :
RG 780 DATA 169,82,141,119,2
GX 790 DATA 169,85,141,120,2,1
       69,78,141
JM 800 DATA 121,2,169,13,141,1
       22,2,169
PQ 810 DATA 4,133,198
RE 820 :
GK 830 DATA 169,0,141,48,208,7
       6,116,164
```

Program 2: Fast Boot

```
EM 0 GOTO 260
PG 1 PN$(1)="0123456789ABCDEF"
     :LP(1)=12345:I=1
JD 2 PN$(2)="0123456789ABCDEF"
     :LP(2)=12345:I=2
JJ 3 PN$(3)="0123456789ABCDEF"
     :LP(3)=12345:I=3
JH 4 DATA 0,4,102,254,195,194,
     205,56,48,123,123
SE 5 IF PEEK(215)<>0 THEN PRIN
     T:PRINT"{TOP}SWITCH TO 40
      COLUMN MONITOR!!":GRAPHI
     C 0
EH 6 FAST:FOR J=1 TO I:BLOAD(P
     N$(J)),B0,P(LP(J)):NEXT
XS 7 BLOAD"LOADER ROUTINE",B0,
     P1024:SE=400:PA=32768
BK 8 FOR I=0 TO 8:POKE SE+I,PE
     EK(PA+I):READ DA:POKE PA+
     I,DA:NEXT
DA 9 READ DA:POKE SE+I,DA:READ
      DA:POKE SE+10,DA:GO64
JE 10 :
RC 20 FOR I=1 TO 5:FAST:NI=NA(
     I):AI=AA(I):IF PN$(I)=""
      THEN BEGIN
FH 30 :IF I<4 THEN DI=DI+1:DL(
     DI)=I:NEXT I
DA 40 :BEND:GOTO 100
MD 50 BANK 1:SZ=PEEK(POINTER(P
     N$(I))):BANK 0:PRINT HH$
     ;PN$(I)
RK 60 FOR J=1024 TO J+SZ-1:PJ=
     PEEK(J):IF PJ<32 THEN PJ
     =PJ+64
HJ 70 POKE NI,PJ:NI=NI+1:NEXT
     {SPACE}J:POKE NI,34:IF S
     Z=16 THEN 100
DF 80 FOR H=NI+1 TO H+15-SZ:PO
     KE H,32:NEXT H
AM 90 :
FA 100 PRINT HH$;LP(I):K1=4:IF
      I>3 THEN K1=2:SLOW
BR 110 FOR K=1025 TO K+K1:POKE
      AI,PEEK(K):AI=AI+1:NEX
     T K:NEXT I
HJ 120 :
RC 130 FAST:POKE 842,48:POKE 8
     43,13:K=2:IF DI THEN BE
     GIN
QD 140 :FOR I=1 TO DI:POKE 842
     +K,ASC(MID$(STR$(DL(I))
     ,2,1))
GP 150 :BEND:K=K+1:POKE 842+K,
     13:K=K+1:NEXT I
EE 160 POKE 842+K,19:K=K+1:POK
     E 842+K,13:K=K+1:POKE 2
     08,K:AD=SB+420
DQ 170 :
GE 180 IF PEEK(AD)<>203 THEN A
     D=AD+1:GOTO 180
JF 190 AD=AD+1:IF PEEK(AD)<>0
     {SPACE}THEN 190
JS 200 FOR J=1 TO 2:AD=AD+1:PO
     KE AD,0:NEXT
FH 210 BQ=AD+1:POKE 4624,BQ AN
     D 255:POKE 4625,BQ/H1
JS 220 :
AM 230 PRINT HH$;"DSAVE";QT$;"
     AUTOEXEC.64";QT$
CB 240 COLOR 5,CC:SLOW:END
RA 250 :
CR 260 EC$=CHR$(27):QT$=CHR$(3
     4):DIM LA(11),EA(11):MT
     =63700:MS=49152
MS 270 HM=32768:H1=256:PN$="FA
     ST LOAD BASIC":BA=0:LA=
     MS:HH$="{2 HOME}{CLR}"
CB 280 IF RGR(X)<>0 THEN PRINT
     :PRINT"SWITCH TO 40 COL
     UMN MONITOR!!!":GRAPHIC
      0
CS 290 PRINT HH$;TAB(81)"STAND
      BY...":LA(0)=LA:GOSUB
     {SPACE}1040:EA(0)=EA
AX 300 LA=LA+H1:LA(1)=LA:PN$="
     FAST RUN BASIC":GOSUB 1
     040:EA(1)=EA
HP 310 LA=LA+H1:LA(10)=LA:PN$=
     "FAST LOAD M/L":GOSUB 1
     040:EA(10)=EA
PR 320 LA=LA+H1:LA(11)=LA:PN$=
     "FAST RUN M/L":GOSUB 10
     40:EA(11)=EA
BR 330 PN$="":PRINT"{CLR}":PRI
     NT:PRINT EC$+"T PLACE P
     ROGRAM DISK INTO DISK D
     RIVE."
MS 340 GOSUB 1070:PRINT"{CLR}
     {SPACE}DO YOU WANT THE
     {SPACE}DIRECTORY (Y/N)
     ":GOSUB 1200
AR 350 PRINT HH$;TAB(80);:IF Z
     Z$="Y" THEN TRAP 1240:O
     PEN 1,8,15,"U0>M0":DIRE
     CTORY:PRINT#1,"U0>M1":D
     CLOSE:PRINT:SLEEP 1:TRA
     P:PRINT TAB(160)"{4 UP}
     ";
SJ 360 PRINT EC$"T ENTER NUMBE
     R OF PROGRAMS (1,2 OR 3
     )."
KK 370 GETKEY NP$:NP=VAL(NP$):
     IF NP<1 OR NP>3 THEN 37
     0:ELSE IF NP=1 THEN 390
AF 380 :PRINT:PRINT" {RVS}REME
     MBER, BASIC PROGRAM MUS
     T BE FIRST"
PR 390 LA=2049:FOR X=1 TO NP:I
     F X>1 THEN BEGIN:PRINT:
     PRINT
JQ 400 :PRINT" THERE IS";MR;"B
     YTES REMAINING"
EF 410 :PRINT" (APPROX.";INT(M
     R/255+1);"DIRECTORY BLO
     CKS)"
MX 420 :BEND:PRINT" ...CONTINU
     E (Y/N)?":GOSUB 1200:IF
      ZZ$="N" THEN STOP
DQ 430 :
KF 440 PRINT:PRINT:PRINT"{UP}
     {SPACE}PROGRAM NAME:";:
     NL=16:GOSUB 1110:PN$(X)
     =PN$
PR 450 :
JR 460 DOPEN#2,(PN$):GOSUB 128
     0:GET#2,LB$,HB$:DCLOSE#
     2
DA 470 HB(X)=ASC(HB$):LB(X)=AS
     C(LB$):LP(X)=H1*HB(X)+L
     B(X)
FP 480 IF LP(X)<2049 THEN PRIN
     T"{2 HOME}{CLR}":PRINT"
      SORRY, CAN'T HANDLE PR
     OGRAMS THAT LOAD":PRINT
     "BELOW THE START OF BAS
     IC!":STOP
QG 490 BA=1:GOSUB 1040:BA=0:SZ
     =EA-LA:EP(X)=LP(X)+SZ:H
     A(X)=EA:IF X=1 THEN BEG
     IN
RJ 500 :LP(4)=(SZ-HM) AND 255:
     LP(5)=INT(SZ/H1)
KA 510 :
CA 520 :R$=CHR$(29):FOR I=1 TO
      8:RT$=RT$+R$:NEXT:FR$=
     RT$+R$+R$+R$
RC 530 :PRINT:PRINT:PRINT:PRIN
     T"(TOGGLE WITH SPACE BA
     R){2 UP}"EC$"J";
KG 540 :PRINT" BASIC:{RVS} *
     {OFF}{2 SPACES}BINARY:
     {RVS}{3 SPACES}{OFF}
     {4 SPACES}(RETURN)";
QP 550 :GOSUB 980:BI=F1*10:F1=
     0
CX 560 :PRINT:PRINT:PRINT
BF 570 :
XP 580 :PRINT:PRINT"{2 SPACES}
     LOAD:{RVS} * {OFF}
     {5 SPACES}RUN:{RVS}
     {3 SPACES}{OFF}
     {4 SPACES}(RETURN)";
AB 590 :GOSUB 980:RN=F1:LF=BI+
     RN
XB 600 :IF LF<2 THEN LP(1)=819
     3:EP(1)=LP(1)+SZ:GOTO 6
     20
SK 610 :BEND:LP(4)=LB(X):LP(5)
     =HB(X)
AX 620 LX(X)=LA:LA=EA+1:MR=MT-
     LA:NEXT
SJ 630 :
QE 640 IF NP=1 AND LF<2 THEN 6
     90:ELSE FOR X=1 TO NP:I
     F X=1 THEN 660
HB 650 IF LP(X)<EP(1) THEN PRI
     NT" OVERLAP ERROR PROGR
     AMS 1 AND";X;:STOP
SC 660 IF LP(X)<7600 THEN PRIN
     T" SORRY, CAN'T HANDLE
     {SPACE}M/L PROGRAMS
     {8 SPACES}THAT LOAD BEL
     OW DECIMAL 7600!":STOP
FP 670 NEXT
CQ 680 :
BX 690 GOSUB 1300:HD$=HN$
AR 692 PRINT HH$;TAB(81)"{RVS}
     PLACE NEW DISKETTE IN D
     ISK DRIVE.":GOSUB 1070
CB 695 GOSUB 1300:IF HN$=HD$ T
     HEN BEGIN
SH 696 :PRINT TAB(81)"YOU DIDN
     'T CHANGE DISKS!":PRINT
     " CONTINUE (Y/N)?";
```

```
DS 697 :GOSUB 1200:IF ZZ$="Y"
       {SPACE}THEN 692
JR 698 :BEND:STOP
QC 700 PRINT"{CLR}"TAB(81)"DOE
       S IT NEED FORMATTING (Y
       /N)?";
MG 710 GOSUB 1200:IF ZZ$="N"TH
       EN PRINT"{CLR}"TAB(80);
       EC$;"T":GOTO 800
CA 720 PRINT:PRINT:PRINT" DISK
        NAME:";:NL=16:GOSUB 11
       10:HD$=PN$
DK 730 PRINT TAB(28)"{UP}";:PR
       INT"ID:";:NL=2:GOSUB 11
       10
XH 740 IF LEN(PN$)=1 THEN PN$=
       PN$+" "
KQ 750 PRINT:PRINT:PRINT EC$;"
       T FORMATTING DISKETTE..
       ."
DK 760 OPEN15,8,15,"N0:"+HD$+"
       ,"+PN$:CLOSE 15
SG 770 IF DS=21 THEN PRINT:PRI
       NT" ID REQUIRED ON THIS
        DISK!":GOTO 720
BJ 780 GOSUB 1280
CD 790 :
BD 800 PRINT"{CLR} MAKING THIS
        A BOOT DISK..."
QP 810 Z$=CHR$(0):Z2$=Z$+Z$:AE
       $="AUTOEXEC.64"
GP 820 OPEN15,8,15:OPEN5,8,5,"
       #":PRINT#15,"B-P";5;0
RD 830 PRINT#5,"CBM"+Z2$+Z2$+A
       E$+Z2$+CHR$(162)+CHR$(2
       6);
AS 840 PRINT#5,CHR$(160)+CHR$(
       11)+CHR$(76)+CHR$(165)+
       CHR$(175);
GA 850 PRINT#5,"RUN"+CHR$(34)+
       AE$+Z$:PRINT#15,"U2";5;
       0;1;0
BH 860 PRINT#15,"B-A";0;1;0:DC
       LOSE:D$=DS$
BJ 870 :
GH 880 PRINT"{CLR} COPYING PRO
       GRAMS TO BOOT DISK..."
DF 890 FOR X=1 TO NP:BSAVE(PN$
       (X)),B1,P(LX(X)) TO P(H
       A(X))
BP 900 GOSUB 1280:NEXT X
EM 910 :
HP 920 BSAVE"LOADER ROUTINE",B
       0,P(LA(LF)) TO P(EA(LF)
       ):GOSUB 1280
EB 930 SB=PEEK(45)+H1*PEEK(46)
       :RESTORE 940
HJ 940 FOR I=1 TO 5:READ AA:AA
       (I)=SB+AA:NEXT:DATA 46,
       92,138,184,188
DS 950 FOR I=1 TO 3:READ AA:NA
       (I)=SB+AA:NEXT:DATA 22,
       68,114
QH 960 CC=RCLR(5):COLOR 5,RCLR
       (0):GOTO 20
QS 970 :
QB 980 PRINTCHR$(27)"J"+RT$;
JM 990 GETKEY KG$:IF KG$=CHR$(
       13) THEN RETURN
PX 1000 IF KG$<>" " THEN 990:E
        LSE IF F1 THEN 1020
GD 1010 PRINT"{RVS} "+FR$+"*";
        :F1=1:GOTO 980
JR 1020 PRINT"{RVS}*"+FR$+" ";
        :F1=0:GOTO 980
FB 1030 :
QP 1040 BLOAD(PN$),B(BA),P(LA)
        :EA=H1*PEEK(175)+PEEK(
        174):GOSUB 1280:RETURN
SD 1060 :
GM 1070 PRINT:PRINT" HIT SPACE
         BAR WHEN READY....."
GE 1090 GETKEY ZZ$:IF ZZ$<>CHR
        $(32) THEN 1090:ELSE R
        ETURN
GF 1100 :
EC 1110 PN$="":GK=0:PRINT"
        {RVS}";
CG 1130 FOR I=1 TO NL:PRINT" "
        ;:NEXT:FORI=1 TO NL:PR
        INT"{LEFT}";:NEXT
GB 1140 GETKEY KG$:IF KG$=CHR$
        (13) THEN 1180:ELSE IF
         KG$=CHR$(20) THEN PRI
        NT KG$+"{INST} {LEFT}"
        ;:GK=LEN(PN$)-1:PN$=LE
        FT$(PN$,GK):GOTO 1140
FP 1160 GK=GK+1:IF GK>NL THEN
        {SPACE}PRINT CHR$(7):G
        OTO 1140
HK 1170 PRINT KG$;:PN$=PN$+KG$
        :GOTO 1140
GG 1180 PRINT KG$;:RETURN
BQ 1190 :
MR 1200 GETKEY ZZ$:IF ZZ$="Y"
        {SPACE}THEN RETURN
QE 1220 IF ZZ$<>"N" THEN 1200:
        ELSE RETURN
KR 1230 :
BD 1240 IF ER=30 THEN RESUME N
        EXT
MQ 1260 PRINT ERR$(ER);EL:STOP
MB 1270 :
XB 1280 IF DS<20 THEN RETURN:E
        LSE PRINT"ERROR: ";DS$
        :DCLOSE:STOP
EC 1290 :
CA 1300 OPEN 15,8,15:OPEN 5,8,
        5,"#":PRINT#15,"U1";5;
        8;5;"#"
HX 1310 HN$="":PRINT#15,"B-P";
        5;144:FOR X=1 TO 20:GE
        T#5,L$:HN$=HN$+L$:NEXT
RS 1320 DCLOSE:RETURN
```

BEFORE TYPING . . .

Before typing in programs, please refer to "How To Type In COMPUTE!'s GAZETTE Programs," which appears before the Program Listings.

Cassette Sleeve Maker

Article on page 52.

```
RC 10 DIM SG$(2,19),TE$(19):RE
      M SET UP ARRAYS
RH 20 FORI=1TO2:FORJ=1TO19
QX 30 SG$(I,J)="{19 SPACES}"
GA 40 NEXTJ:NEXTI
SQ 50 SET$="+----------------
      ----------------------+
      "
GX 60 AX$="------------------
      ":ZX$="{18 SPACES}"
SD 70 FM$="A":FC$="B"
AE 80 PRINT"{CLR}{3 DOWN}
      {10 RIGHT}{RVS}CASSETTE
      {SPACE}SLEEVE MAKER{OFF}
      "
HB 90 PRINT"{5 DOWN}{8 RIGHT}E
      NTER THE NUMBER OF SIDES
      "
QG 100 PRINT"{DOWN}{8 RIGHT}YO
       U WISH TO LABEL (1/2)";
RJ 110 INPUTC:IFC<>1ANDC<>2THE
       N110
XJ 120 AT=C
SS 130 PRINT"{CLR}{4 DOWN}
       {9 RIGHT}THE NEXT SCREE
       N WILL"
QJ 140 PRINT"{DOWN}{7 RIGHT}SH
       OW HALF OF A TAPE LABEL
       "
CR 150 PRINT"{4 DOWN}{5 RIGHT}
       ENTERED LINES MAY {RVS}
       NOT{OFF} CONTAIN:"
AG 160 PRINT"{4 DOWN}{8 RIGHT}
       {RVS}; OR , OR <, OR +,
        OR ↑"
HK 170 PRINT"{6 DOWN}{8 RIGHT}
       HIT ANY KEY TO CONTINUE
       "
JJ 180 GETS$:IFS$=""THEN180
RX 190 REM{2 SPACES}*MAIN PROG
       RAM*
XX 200 FORI=1TOC
CB 210 FORJ=1TO19
DR 220 GOSUB700:GOSUB1020
DA 230 GOSUB650
QP 240 PRINT"{HOME}{DOWN}":FOR
       R=1TOJ
JK 250 IFR=15ORR=17THENPRINT"
       {DOWN}{UP}"
HE 260 PRINT"{2 RIGHT}";SG$(I,
       R)
AP 270 NEXTR
AF 280 GOSUB910
JX 290 IFJ>15THENPRINT"{DOWN}
       {UP}"
EF 300 GOSUB1170:INPUTC$
FM 310 IFLEFT$(C$,1)=CHR$(94)A
       NDJ<15THENJ=15:GOTO220
PM 320 SG$(I,J)=C$
AK 330 GOSUB910:SG$(I,J)=LEFT$
       (SG$(I,J),19)
AK 340 GOSUB1210
SB 350 BB$=SG$(I,J):GOSUB1110:
       SG$(I,J)=BB$
HG 360 PRINT"{HOME}{DOWN}":FOR
       IK=1TOJ:GOSUB1150
AD 370 IFIK=JTHENPRINT"{UP}"
JH 380 PRINT"{2 RIGHT}";SG$(I,
       IK):NEXTIK
HP 390 GOSUB1060:IFKS$<>"Y"AND
       KS$<>"N"THENPRINT"{UP}"
       :GOTO390
AJ 400 IFKS$="N"THENSG$(I,J)=Z
       X$:GOTO220
GX 410 NEXTJ
RA 420 NEXTI
BB 430 REM{5 SPACES}** HARD CO
       PY **
FB 440 PRINT"{CLR}{7 DOWN}
       {6 RIGHT}PRESS ANY KEY
       {SPACE}FOR PRINTOUT"
MD 450 GETA$:IFA$=""THEN450
JR 460 LB=2:LA=1:IFAT=1THENLA=
       1:LB=2
GQ 470 OPEN 4,4
KP 480 PRINT#4,SET$
CB 490 PRINT#4,"+ SIDE A
       {15 SPACES}SIDE B
       {12 SPACES}+"
ED 500 FORJ=1TO19
GP 510 TE$(J)="+ "+SG$(LA,J)+"
        "+SG$(LB,J)+"+":NEXTJ
SG 520 FORJ=1TO14:PRINT#4,TE$(
       J):NEXTJ
AR 530 PRINT#4,SET$
RR 540 PRINT#4,TE$(15):PRINT#4
       ,TE$(16)
JX 550 PRINT#4,SET$
EB 560 FORI=17TO19:PRINT#4,TE$
       (I):NEXTI
AS 570 PRINT#4,SET$
CB 580 CLOSE4
QH 590 PRINT"{CLR}{6 DOWN}WOUL
       D YOU LIKE ANOTHER LABE
       L (Y/N)";
JB 600 INPUTA$:IFA$<>"Y"ANDA$<
       >"N"THEN600
```

```
SX 610 IFA$="Y"THEN200
ES 620 PRINT"{CLR}":END
AD 630 REM{4 SPACES}*** SUBROU
       TINES ***
MD 640 REM{2 SPACES}---SUB POI
       NTER----
DM 650 GOSUB910
GB 660 GOSUB1180:IFJ>15THENPRI
       NT"{DOWN}{UP}"
DS 670 PRINTTAB(21)"←"
JA 680 RETURN
DQ 690 REM{2 SPACES}------SUB
       {SPACE}SETUP-----
GF 700 PRINT"{CLR}":IF I=2THEN
       810
FH 710 FD$=" +"+AX$
SX 720 PRINT" +{RVS}SIDE ";FM$
       ;"{13 SPACES}{OFF}"
AG 730 FORII=1TO14:PRINT" +":N
       EXTII
PB 740 PRINTFD$
HE 750 PRINT" +"
DH 760 PRINT" +"
HC 770 PRINTFD$
EJ 780 FORII=1TO3:PRINT" +":NE
       XTII
XF 790 PRINT FD$
SH 800 GOSUB970:RETURN
AQ 810 FD$="{2 SPACES}"+AX$+"+
       "
GC 820 PRINT" +{RVS}SIDE ";FC$
       ;"{13 SPACES}{OFF}+"
XG 830 FORII=1TO14:PRINTTAB(21
       )"+":NEXTII
AG 840 PRINTFD$
XC 850 PRINTTAB(21)"+"
DD 860 PRINTTAB(21)"+"
QJ 870 PRINTFD$
FC 880 FORII=1TO3:PRINTTAB(21)
       "+":NEXTII
PB 890 PRINTFD$:GOSUB970:RETUR
       N
XE 900 REM{2 SPACES}---- SUB C
       URSOR ----
AG 910 PRINT"{HOME}"
SS 920 FORD=1TOJ
FQ 930 PRINT"{DOWN}{UP}"
SA 940 NEXTD:PRINT"{UP}":RETUR
       N
ER 950 :
GG 960 REM{2 SPACES}---- SUB 1
       9 CHARACTERS ----
JM 970 PRINT"{HOME}"
XC 980 PRINTTAB(22)"←←←THIS IS
        19"
BB 990 PRINTTAB(25)"CHARACTERS
       "
XE 1000 PRINTTAB(25)"FOR REFER
        ENCE"
DS 1010 RETURN
PG 1020 PRINT"{HOME}"
DB 1030 PRINT"{12 DOWN}"TAB(23
        )"INPUT LINE #";J
DA 1040 RETURN
GC 1050 REM{2 SPACES}------SUB
         CORRECT----
JX 1060 PRINT"{HOME}":KS$=""
FD 1070 PRINT"{19 DOWN}"TAB(23
        )"{RVS}IS THIS ENTRY"
GP 1080 PRINTTAB(23)"CORRECT (
        Y/N)"
MQ 1090 PRINTTAB(29);:INPUTKS$
SJ 1100 REM{4 SPACES}------ SU
        B 19 STRING ------
MX 1110 FR=LEN(BB$):F=19-FR:TR
        $=RIGHT$(ZX$,F)
JQ 1120 BB$=BB$+TR$:RETURN
EG 1130 RETURN
EX 1140 REM{2 SPACES}----SUB S
        KIP-----
JM 1150 IFIK=15ORIK=17THEN PRI
        NT"{DOWN}{UP}"
DJ 1160 RETURN
AH 1170 REM{2 SPACES}---SUB IN
        PUT SKIP---
XM 1180 IFJ=15ORJ>=17THEN PRIN
        T"{DOWN}{UP}"
MM 1190 RETURN
QE 1200 REM{2 SPACES}----SUB B
        LANK SPACE----
BD 1210 FK$=LEFT$(SG$(I,J),1)
HC 1220 IFFK$="←"ORFK$="+"THEN
        SG$(I,J)=ZX$
CQ 1230 RETURN
```

SpeedScript Date And Time Stamper

See instructions in article on page 76 before typing in.

Program 1: *SpeedScript* Date And Time Stamper

```
C8FB:A9 08 AA A0 01 20 BA FF C1
C903:A9 0B A2 4A A0 C9 20 BD 51
C90B:FF A9 00 20 D5 FF 90 01 DB
C913:60 A0 03 B9 6D CA 99 08 CC
C91B:DD 88 10 F7 A2 F6 A0 CA 3E
C923:8E 32 03 8C 33 03 A9 C7 74
C92B:8D B1 09 A2 55 A0 C9 8E 8C
C933:70 14 8C 71 14 A2 F4 A0 62
C93B:C9 8E A2 11 8C A3 11 A9 7B
C943:FF 8D 6C CA 4C 0D 08 53 6E
C94B:50 45 45 44 53 43 52 49 DA
C953:50 54 20 E7 FF 20 54 CA 9A
C95B:A9 37 85 01 20 6D C9 A9 46
C963:08 85 BA 20 B0 CC 20 60 0F
C96B:CA 60 AE 71 CA BD DC CA 3B
C973:A8 B9 7A CA F0 06 20 D2 78
C97B:FF C8 D0 F5 A9 00 AE 72 D7
C983:CA 20 CD BD A9 2C 20 D2 2B
C98B:FF A9 20 20 D2 FF A2 13 7E
C993:A9 00 20 CD BD AE 73 CA 37
C99B:A9 00 20 CD BD A9 20 20 D9
C9A3:D2 FF A2 20 AD 70 CA 48 04
C9AB:29 10 F0 02 A2 31 8A 20 25
C9B3:D2 FF 68 20 EB C9 A9 3A D3
C9BB:20 D2 FF AD 6F CA 48 4A 70
C9C3:4A 4A 4A 20 EB C9 68 20 D1
C9CB:EB C9 A9 20 20 D2 FF A9 F4
C9D3:41 AC 70 CA C0 80 90 02 19
C9DB:A9 50 20 D2 FF A9 4D 20 EA
C9E3:D2 FF A9 0D 20 D2 FF 60 93
C9EB:29 0F 18 69 30 20 D2 FF 19
C9F3:60 A0 03 B9 08 DD 99 6D 34
C9FB:CA 88 10 F7 AD 70 CA 29 86
CA03:80 D0 46 AD 6C CA D0 46 27
CA0B:A9 FF 8D 6C CA AE 71 CA AC
CA13:E0 02 D0 11 A9 1D AC 73 53
CA1B:CA C0 58 F0 0B C0 5C F0 65
CA23:07 C0 60 F0 03 BD E9 CA 35
CA2B:CD 72 CA D0 17 A0 01 8C 74
CA33:72 CA EE 71 CA AD 71 CA 64
CA3B:C9 0D D0 12 8C 71 CA EE E2
CA43:73 CA D0 0A EE 72 CA D0 A7
CA4B:05 A9 00 8D 6C CA 4C 31 FE
CA53:EA A0 05 B9 FA 00 99 74 42
CA5B:CA 88 10 F7 60 A0 05 B9 43
CA63:74 CA 99 FA 00 88 10 F7 03
CA6B:60 00 00 50 00 81 09 1A 68
CA73:56 00 00 00 00 00 00 6A 9E
CA7B:41 4E 55 41 52 59 20 00 3C
CA83:66 45 42 52 55 41 52 59 B8
CA8B:20 00 6D 41 52 43 48 20 43
CA93:00 61 50 52 49 4C 20 00 6C
CA9B:6D 41 59 20 00 6A 55 4E 08
CAA3:45 20 00 6A 55 4C 59 20 39
CAAB:00 61 55 47 55 53 54 20 79
CAB3:00 73 45 50 54 45 4D 42 68
CABB:45 52 20 00 6F 43 54 4F 0D
CAC3:42 45 52 20 00 6E 4F 56 C6
CACB:45 4D 42 45 52 20 00 64 6B
CAD3:45 43 45 4D 42 45 52 20 46
CADB:00 00 00 09 13 1A 21 26 6B
CAE3:2C 32 3A 45 4E 58 00 1F AA
CAEB:1C 1F 1E 1F 1E 1F 1F 1E D6
CAF3:1F 1E 1F A5 BA C9 08 F0 DC
CAFB:08 C9 09 F0 04 4C ED F5 5B
CB03:60 20 ED F5 B0 FA A5 90 3D
CB0B:D0 F6 A2 10 A9 A0 9D 9C C5
CB13:CC CA 10 FA A0 00 A2 00 BF
CB1B:B1 BB C8 C9 2C F0 0C C9 37
CB23:3A F0 F3 9D 9C CC E8 C4 1B
CB2B:B7 90 ED AD 73 CA 38 E9 7C
CB33:55 0A 0A 0A 0A 18 6D 71 D6
CB3B:CA 8D 98 CC AD 72 CA 8D D5
CB43:99 CC AD 70 CA 8D 9A CC 26
CB4B:AD 6F CA 8D 9B CC 20 54 6C
CB53:CA A9 07 85 FF A9 D6 85 CD
CB5B:FB A9 CB 85 FC A9 00 85 41
CB63:FD A9 05 85 FE A5 BA 20 81
CB6B:B1 FF A9 6F 20 93 FF A5 FC
CB73:FD A4 FE 8D D2 CB 8C D3 9E
CB7B:CB A0 00 B9 CF CB 20 A8 53
CB83:FF C8 C0 06 D0 F5 A0 00 65
CB8B:B1 FB 20 A8 FF C8 C0 20 4E
CB93:90 F6 A5 FB 69 1F 85 FB 74
CB9B:A5 FC 69 00 85 FC A5 FD DB
CBA3:69 20 85 FD A5 FE 69 00 84
CBAB:85 FE 20 AE FF C6 FF D0 A0
CBB3:B4 A5 BA 20 B1 FF A9 6F B8
CBBB:20 93 FF A9 55 20 A8 FF 5F
CBC3:A9 43 20 A8 FF 20 AE FF 6D
CBCB:20 60 CA 60 4D 2D 57 00 B8
CBD3:05 20 EA 20 00 C1 78 A9 F6
CBDB:12 A0 01 8D 00 03 8C 01 C3
CBE3:03 20 76 05 A9 03 85 3C C4
CBEB:A2 00 86 4B F0 29 A0 00 C7
CBF3:B1 3B C9 82 D0 19 C8 C8 D9
CBFB:C8 B9 C3 05 C9 2A F0 2E 36
CC03:C9 3F F0 04 D1 3B D0 07 D3
CC0B:C8 C0 13 F0 21 D0 EA E6 B3
CC13:4B A6 4B E0 08 F0 07 BD 43
CC1B:BA 05 85 3B D0 D0 AD 00 DC
CC23:03 F0 07 AC 01 03 A2 00 7F
CC2B:F0 B7 58 4C 45 D9 A0 16 E3
CC33:A2 00 BD C2 05 91 3B C8 AF
CC3B:E8 E0 04 D0 F5 A9 90 85 0C
CC43:00 58 24 00 30 FC 4C 9E 24
CC4B:C1 AC 01 03 84 07 AD 00 DC
CC53:03 85 06 A9 B0 85 00 58 1F
CC5B:24 00 30 FC 78 A5 00 C9 01
CC63:01 D0 24 A9 EE 8D 0C 1C B2
CC6B:A9 06 85 32 A9 00 85 33 BA
CC73:85 30 A9 03 85 31 A9 80 06
CC7B:85 00 58 24 00 30 FC 78 58
CC83:A5 00 C9 01 D0 01 60 18 9C
CC8B:69 18 4C C8 C1 02 22 42 92
CC93:62 82 A2 C2 E2 28 43 29 E6
CC9B:20 31 39 38 36 20 42 4F 42
CCA3:42 20 4B 4F 44 41 44 45 B9
CCAB:4B 00 EA EA EA A9 37 85 E8
CCB3:01 A9 49 8D 22 CF A9 02 DF
CCBB:85 FD A9 0F 8D 1C CF 20 5A
CCC3:E4 CE A9 24 8D 22 CF A9 39
CCCB:06 85 FD A9 00 8D 1C CF 62
CCD3:20 E4 CE A2 01 20 C6 FF D0
CCDB:A9 22 20 AE CE 20 CF FF 58
CCE3:8D 1F CF 20 CF FF 8D 20 C1
CCEB:CF A9 02 8D 1C CF 85 FD 1A
CCF3:20 E4 CE A2 01 20 C6 FF F0
CCFB:A9 8E 20 AE CE A2 45 A0 29
CD03:CF 20 0A CF A2 00 20 CF F1
CD0B:FF 20 D2 FF E8 E0 17 D0 D2
CD13:F5 A2 59 A0 CF 20 0A CF 6A
CD1B:A9 59 20 AE CE A9 00 8D 7B
CD23:1E CF A9 00 8D 1D CF A2 1A
CD2B:00 A9 14 20 D8 CE 20 CF C7
CD33:FF 8D 21 CF 20 B7 FF F0 24
CD3B:49 A9 0D 20 D2 FF A9 00 73
CD43:AE 1E CF 20 CD BD A2 3C A0
CD4B:A0 CF 20 0A CF AE 1F CF 17
CD53:AD 20 CF 20 CD BD A2 2F A3
CD5B:A0 CF 20 0A CF A9 00 85 8A
CD63:FD A9 0F 8D 1C CF 20 E4 68
CD6B:CE A2 01 20 C9 FF A2 84 51
CD73:A0 CF 20 0A CF 20 CC FF 90
```

```
CD7B:A9 01 20 C3 FF A9 36 85 05
CD83:01 60 20 E1 FF F0 D6 AD F8
CD8B:21 CF D0 08 A9 1D 20 AE F6
CD93:CE 4C 8F CE 29 80 D0 04 79
CD9B:A9 2A D0 02 A9 20 20 D2 B1
CDA3:FF AD 21 CF 29 07 0A A8 ED
CDAB:A2 00 B9 25 CF 20 D2 FF C6
CDB3:C8 E8 E0 02 D0 F4 AD 21 01
CDBB:CF 29 40 F0 05 A9 3C 20 08
CDC3:D2 FF 20 CF FF 20 CF FF E9
CDCB:A9 04 20 D8 CE A2 00 20 EF
CDD3:CF FF C9 A0 D0 02 A9 2D A9
CDDB:20 D2 FF E8 E0 10 D0 EF A3
CDE3:A9 03 20 AE CE A9 18 20 71
CDEB:D8 CE 20 CF FF D0 08 A9 A5
CDF3:05 20 AE CE 4C 78 CE 48 07
CDFB:29 0F AA E0 0A B0 05 A9 1A
CE03:20 20 D2 FF 20 A8 CE A9 FD
CE0B:2D 20 D2 FF 20 CF FF AA 8C
CE13:E0 0A B0 05 A9 30 20 D2 2B
CE1B:FF 20 A8 CE A9 2D 20 D2 D7
CE23:FF 68 4A 4A 4A 4A 18 69 DD
CE2B:55 AA 20 A8 CE A9 21 20 2C
CE33:D8 CE 20 CF FF 48 A2 20 78
CE3B:29 10 F0 02 A2 31 8A 20 BE
CE43:D2 FF 68 48 29 0F AA 20 D6
CE4B:A8 CE A9 3A 20 D2 FF 20 36
CE53:CF FF 48 4A 4A 4A 4A AA 41
CE5B:20 A8 CE 68 29 0F AA 20 8E
CE63:A8 CE A2 41 68 29 80 F0 4B
CE6B:02 A2 50 8A 20 D2 FF 20 D1
CE73:CF FF 20 CF FF A9 00 20 C0
CE7B:D8 CE 20 CF FF AA 20 CF F4
CE83:FF 20 CD BD A9 0D 20 D2 53
CE8B:FF EE 1E CF 20 BB CE EE 22
CE93:1D CF AD 1D CF C9 08 D0 C1
CE9B:03 4C 25 CD 20 CF FF 20 AF
CEA3:CF FF 4C 2A CD A9 00 20 8A
CEAB:CD BD 60 85 FD A2 00 20 9E
CEB3:CF FF E8 E4 FD D0 F8 60 2A
CEBB:20 CC FF 20 E4 FF F0 0F B6
CEC3:20 E1 FF D0 05 68 68 4C DD
CECB:60 CD 20 E4 FF F0 F1 A2 A9
CED3:01 20 C6 FF 60 48 38 20 87
CEDB:F0 FF 68 A8 18 20 F0 FF AC
CEE3:60 20 CC FF A9 01 20 C3 A8
CEEB:FF A9 01 A6 BA AC 1C CF 0F
CEF3:20 BA FF A5 FD A2 22 A0 0A
CEFB:CF 20 BD FF 20 C0 FF 90 D5
CF03:05 68 68 4C 78 CD 60 86 53
CF0B:FB 84 FC A0 00 B1 FB F0 23
CF13:07 C8 20 D2 FF 4C 10 CF BA
CF1B:60 00 00 00 00 00 00 24 0F
CF23:30 3A 44 4C 53 51 50 47 7E
CF2B:55 52 52 4C 20 42 4C 4F 0B
CF33:43 4B 53 20 46 52 45 45 FE
CF3B:00 20 46 49 4C 45 53 20 7E
CF43:20 00 0D 12 D3 50 45 45 65
CF4B:44 D3 43 52 49 50 54 20 E3
CF53:C4 CF D3 92 20 00 0D 12 1A
CF5B:42 4C 4B 20 2D 20 46 49 5A
CF63:4C 45 4E 41 4D 45 20 20 38
CF6B:2D 2D 2D 20 20 54 50 20 A7
CF73:2D 20 44 41 54 45 20 2D 73
CF7B:2D 20 54 49 4D 45 20 0D A5
CF83:00 55 49 0D 00 00 00 00 72
```

Program 2: Date And Time Loader

```
CA 10 REM SPEEDSCRIPT DATE/TIM
      E BOOT PROGRAM
XS 20 A$="SPEEDSCRIPT DATE"
JB 30 IF A=0 THEN A=1:PRINT"LO
      ADING..."A$:LOAD A$,8,1
SJ 40 PRINT CHR$(147) SPC(131)
       A$
GC 50 ML=51451:CL=51823:U$=CHR
      $(145)+CHR$(145)
CR 60 PRINT SPC(85)"SET THE DA
      TE (MN/DT/YR)":PRINT
QA 70 INPUT"MONTH{2 SPACES}(1-
      12){5 SPACES}{5 LEFT}";M
      N
JP 80 IF MN<1 OR MN>12 THEN PR
      INT U$:GOTO70
CH 90 INPUT" DATE{2 SPACES}(1-
      31){5 SPACES}{5 LEFT}";D
      T
FQ 100 IF DT<1 OR DT>31 THEN P
      RINT U$:GOTO90
EA 110 INPUT" YEAR (86-99)
      {5 SPACES}{5 LEFT}";YR
FF 120 IF YR<86 OR YR>99 THEN
      {SPACE}PRINT U$:GOTO110
HD 130 PRINT SPC(85)"SET THE T
      IME (HR/MS/AM-PM)":PRIN
      T
BJ 140 INPUT"HOURS{2 SPACES}(1
      -12){5 SPACES}{5 LEFT}"
      ;HR
RG 150 IF HR<1 OR HR>12 THEN P
      RINT U$:GOTO140
CF 160 INPUT" MINS{2 SPACES}(0
      -59){5 SPACES}{5 LEFT}"
      ;MS
FQ 170 IF MS >59 THEN PRINT U$
      :GOTO160
MQ 180 INPUT"AM-PM{3 SPACES}(A
      /P){5 SPACES}{5 LEFT}";
      P$
FM 190 IF P$ <>"A" AND P$<>"P"
      THEN PRINT U$:GOTO180
EB 200 FLAG=128:IF P$="A"AND H
      R<12 THEN FLAG=0
RJ 210 IF P$="P"AND HR=12 THEN
       FLAG=0
KF 220 BY=HR:GOSUB300:HR=BY OR
       FLAG
BF 230 BY=MS:GOSUB300:MS=BY
MR 240 POKE CL,MS:POKE CL+1,HR
      :POKE CL+2,MN
GA 250 POKE CL+3,DT:POKE CL+4,
      YR
GG 260 PRINT:PRINT"PUT SPEEDSC
      RIPT DISK IN DRIVE 0, U
      NIT 8"
MB 270 PRINT" - WHEN READY, PR
      ESS RETURN.":SYS 65487:
      SYS ML
RM 280 POKE 52578,240:POKE 525
      79,20
SJ 290 END
AC 300 X=INT(BY/10):Y=BY-10*X:
      BY=16*X+Y:RETURN
```

SpeedSearch

See instructions in article on page 75 before typing in.

```
0801:36 08 0A 00 85 22 53 45 10
0809:41 52 43 48 20 53 54 52 84
0811:49 4E 47 22 3B 53 53 24 56
0819:3A 8B C3 28 53 53 24 29 7D
0821:B1 32 35 A7 99 22 54 4F 05
0829:4F 20 4C 4F 4E 47 21 22 5B
0831:3A 89 31 30 00 40 08 14 0F
0839:00 9E 32 31 31 34 00 00 A4
0841:00 A0 02 B1 2D 8D 30 0B DF
0849:A9 00 8D 2B 0B 8D 31 0B 8E
0851:20 F9 08 20 49 09 A9 AF 64
0859:A0 0B 20 1E AB A9 02 A2 0D
0861:08 A0 00 20 BA FF A9 02 CA
0869:A2 26 A0 0B 20 BD FF 20 31
0871:C0 FF A2 02 20 C6 FF A0 13
0879:06 20 42 09 20 CF FF C9 77
0881:00 D0 F9 A0 04 20 42 09 3D
0889:A5 90 29 40 D0 39 20 CF 35
0891:FF C9 22 D0 F3 20 09 0B A2
0899:A0 00 20 CF FF C9 22 F0 57
08A1:07 99 9F 0B C8 4C 9B 08 F6
08A9:20 CF FF C9 20 F0 F9 C9 DC
08B1:50 D0 09 20 27 09 20 15 F3
08B9:09 EE 31 0B 20 E1 FF D0 3A
08C1:03 4C 16 0B 4C 7D 08 20 62
08C9:CC FF A9 02 20 C3 FF 20 C5
08D1:F9 08 AD 31 0B F0 14 20 0E
08D9:BC 09 20 15 09 CE 31 0B D0
08E1:20 E1 FF D0 03 4C 16 0B 08
08E9:4C D3 08 AD 2B 0B D0 07 1F
08F1:A9 4B A0 0B 20 1E AB 60 9F
08F9:A5 2D 8D 29 0B A5 2E 8D 45
0901:2A 0B 18 AD 29 0B 69 05 16
0909:8D 29 0B AD 2A 0B 69 00 B8
0911:8D 2A 0B 60 18 AD 29 0B B0
0919:69 11 8D 29 0B AD 2A 0B D6
0921:69 00 8D 2A 0B 60 AD 29 9A
0929:0B 85 FC AD 2A 0B 85 FD 23
0931:A0 00 B9 9F 0B 91 FC C8 26
0939:C0 10 D0 F6 A9 00 91 FC A6
0941:60 20 CF FF 88 D0 FA 60 63
0949:A9 01 A2 08 A0 0F 20 BA 81
0951:FF A9 00 20 BD FF 20 C0 BE
0959:FF A2 01 20 C9 FF A9 49 21
0961:20 D2 FF 20 CC FF A9 01 F4
0969:20 C3 FF 60 A0 00 CC 30 51
0971:0B B0 0D B1 FC D1 FE F0 10
0979:03 A9 FF 60 C8 4C 6F 09 DC
0981:A9 00 60 86 FC 84 FD A0 73
0989:01 CC 30 0B B0 0A B1 FC 14
0991:88 91 FC C8 C8 4C 8A 09 0E
0999:60 8D 28 0B C9 41 90 0A 73
09A1:C9 5B B0 06 38 E9 40 8D 5D
09A9:28 0B 29 3F 0E 28 0B 2C FE
09B1:28 0B 10 02 09 80 70 02 E9
09B9:09 40 60 A9 03 A2 08 A0 5A
09C1:03 20 BA FF A9 10 AE 29 C8
09C9:0B AC 2A 0B 20 BD FF 20 9A
09D1:C0 FF A2 03 20 C6 FF 20 05
09D9:CF FF 8D 2E 0B 20 CF FF E0
09E1:8D 2F 0B 38 A9 00 ED 2E C2
09E9:0B 8D 28 0B A9 25 ED 2F 87
09F1:0B 0D 28 0B D0 08 A9 FF 7C
09F9:80 2B 0B 4C 02 0A 4C 00 94
0A01:0B A9 74 A0 0B 20 1E AB 5E
0A09:AD 29 0B AC 2A 0B 20 1E 46
0A11:AB A9 AF A0 0B 20 1E AB 26
0A19:A0 00 8C 2C 0B 8C 2D 0B C1
0A21:A5 90 29 40 D0 5D 20 CF 61
0A29:FF 20 9A 09 99 32 0B C8 9D
0A31:CC 30 0B 90 EB A9 32 85 12
0A39:FC A9 0B 85 FD A0 03 B1 1A
0A41:2D 85 FE A0 04 B1 2D 85 FD
0A49:FF 20 6D 09 F0 03 4C 5A 2A
0A51:0A EE 2C 0B D0 03 EE 2D F9
0A59:0B 20 E1 FF D0 03 4C 16 78
0A61:0B A2 32 A0 0B 20 84 09 DE
0A69:A5 90 29 40 D0 15 20 CF 88
0A71:FF 20 9A 09 CE 30 0B AC 6B
0A79:30 0B 99 32 0B EE 30 0B 3E
0A81:4C 36 0A 38 AD 2C 0B E9 2C
0A89:00 8D 28 0B AD 2D 0B E9 D8
0A91:00 0D 28 0B F0 33 38 AD 11
0A99:2C 0B E9 01 8D 28 0B AD A4
0AA1:2D 0B E9 00 0D 28 0B F0 5C
0AA9:2A AC 2C 0B AD 2D 0B 20 8C
0AB1:95 B3 20 DD BD 20 1E AB B5
0AB9:A9 8A A0 0B 20 1E AB A9 84
0AC1:91 A0 0B 20 1E AB 4C E2 45
0AC9:0A A9 86 A0 0B 20 1E AB E8
0AD1:4C DB 0A A9 81 A0 0B 20 A3
0AD9:1E AB A9 8A A0 0B 20 1E 55
0AE1:AB A9 94 A0 0B 20 1E AB 93
0AE9:AD 29 0B AC 2A 0B 20 1E 27
0AF1:AB A9 AF A0 0B 20 1E AB 07
0AF9:A9 AF A0 0B 20 1E AB 20 84
0B01:CC FF A9 03 20 C3 FF 60 53
0B09:A0 00 A9 A0 99 9F 0B C8 D8
0B11:C0 10 90 F8 60 20 CC FF 4A
0B19:A9 02 20 C3 FF A9 03 20 91
0B21:C3 FF 4C 7B E3 24 30 00 6A
0B29:00 00 00 00 00 00 00 00 3F
0B31:00 00 00 00 00 00 00 00 47
0B39:00 00 00 00 00 00 00 00 4F
0B41:00 00 00 00 00 00 00 00 57
0B49:00 00 4E 4F 20 53 50 45 52
0B51:45 44 53 43 52 49 50 54 66
0B59:20 46 49 4C 45 53 20 46 FC
0B61:4F 55 4E 44 20 4F 4E 20 7D
```

```
0B69:54 48 49 53 20 44 49 53 12
0B71:4B 2E 00 53 45 41 52 43 05
0B79:48 49 4E 47 2E 2E 2E 00 CA
0B81:20 4F 4E 45 00 20 4E 4F 06
0B89:00 20 4D 41 54 43 48 00 A5
0B91:45 53 00 20 46 4F 55 4E 89
0B99:44 20 49 4E 20 00 00 00 E8
0BA1:00 00 00 00 00 00 00 00 B7
0BA9:00 00 00 00 00 00 0D 00 D9
```

BEFORE TYPING . . .

Before typing in programs, please refer to "How To Type In COMPUTE!'s GAZETTE Programs," which appears before the Program Listings.

No-SYS Loader

See instructions in article on page 87 before typing in.

```
0801:0B 08 0A 00 9E 32 30 36 2E
0809:31 00 00 00 20 E7 FF A9 FB
0811:00 A2 36 A0 03 20 BD FF AE
0819:A0 00 20 1E 09 A9 08 85 E3
0821:BA A9 C0 85 9D A9 00 85 82
0829:93 85 90 A5 BA A4 B7 D0 79
0831:05 A2 08 4C 37 A4 20 B3 72
0839:F5 A9 60 85 B9 20 D5 F3 01
0841:A5 BA 20 09 ED A5 B9 20 01
0849:C7 ED 20 13 EE 8D 3B 0A 1C
0851:AA A5 90 4A 4A 90 05 A2 18
0859:04 4C 37 A4 A0 63 20 2F B1
0861:F1 20 C1 F5 A0 55 20 3B DF
0869:09 20 13 EE 8D 41 0A 8E 6B
0871:83 0A 8D 84 0A 20 CD BD E9
0879:AD 41 0A C9 09 B0 0B 20 CF
0881:28 F5 A0 33 20 3B 09 4C B6
0889:74 A4 38 A9 85 85 AE E9 28
0891:00 8D 2E 0A A9 0A 85 AF 9B
0899:E9 02 8D 36 0A 20 F0 F4 DB
08A1:A0 12 20 3B 09 20 60 A5 6D
08A9:86 7A 84 7B 20 73 00 B0 63
08B1:0D 20 6B A9 A5 14 8D 83 74
08B9:0A A5 15 8D 84 0A A0 75 B6
08C1:20 1E 09 A9 20 D0 03 B9 29
08C9:36 03 99 11 0A 88 10 F7 84
08D1:A0 64 20 1E 09 38 A5 AE 54
08D9:E9 85 8D 2A 0A A5 AF E9 C4
08E1:0A 8D 32 0A A9 01 85 AC 4A
08E9:A9 0A 85 AD A9 61 85 B9 74
08F1:A4 B7 20 D5 F3 20 8F F6 D9
08F9:A5 BA 20 0C ED A5 B9 20 E9
0901:B9 ED A0 00 A9 01 20 DD EE
0909:ED A9 08 20 DD ED 20 24 8A
0911:F6 A5 90 F0 05 A0 47 20 82
0919:3B 09 4C 74 A4 20 3B 09 01
0921:A0 00 20 CF FF C9 22 F0 E0
0929:F9 C9 0D F0 0A 99 36 03 81
0931:C8 C0 15 90 ED A0 14 84 22
0939:B7 60 B9 47 09 F0 06 20 23
0941:D2 FF C8 D0 F5 60 53 4F 0A
0949:55 52 43 45 20 46 49 4C 50
0951:45 2D 4E 41 4D 45 3A 00 23
0959:0D 0D 53 59 53 2D 41 44 4B
0961:44 52 28 44 45 43 29 20 1D
0969:43 52 3D 53 54 41 52 54 2F
0971:20 4F 46 20 50 47 4D 3A A6
0979:00 0D 46 49 4C 45 20 41 25
0981:44 44 52 20 54 4F 4F 20 B1
0989:4C 4F 57 21 00 0D 53 41 AE
0991:56 45 20 45 52 52 4F 52 45
0999:21 21 00 20 20 20 53 54 03
09A1:41 52 54 20 41 44 44 52 6B
09A9:3A 00 0D 0D 4E 45 57 20 A1
09B1:46 49 4C 45 2D 4E 41 4D 89
09B9:45 3A 00 0D 52 45 4D 41 51
09C1:52 4B 53 3A 00 8D 5C 08 D4
09C9:A0 2D A2 A8 86 0E 84 0F DA
09D1:A0 00 98 91 0E A0 67 A2 C4
09D9:FF 86 14 84 15 A0 68 A2 F6
09E1:00 8E 76 09 8C 77 09 20 6B
09E9:E9 0B A9 01 8D 4F 08 A9 5C
09F1:00 8D 50 08 A9 05 A0 FF 94
09F9:A2 00 20 BA FF A9 00 20 D3
0A01:0B 08 0A 00 9E 32 30 38 34
0A09:38 00 26 08 14 00 8F 20 5E
0A11:20 20 20 20 20 20 20 20 25
0A19:20 20 20 20 20 20 20 20 2D
0A21:20 20 20 20 00 00 00 18 6B
0A29:A9 00 85 FB 69 00 85 25 FD
0A31:A9 00 85 FC 69 00 85 26 17
0A39:18 A9 00 65 FB 85 27 A9 08
0A41:00 65 FC 85 28 A2 FF A0 13
0A49:00 8C 01 08 8C 02 08 F0 8E
0A51:04 B1 25 91 27 C6 25 E4 15
0A59:25 D0 02 C6 26 C6 27 E4 60
0A61:27 D0 02 C6 28 C6 FB E4 23
0A69:FB D0 E6 C6 FC E4 FC D0 3F
0A71:E0 A5 28 C9 A0 B0 0A 85 62
0A79:34 85 38 A5 27 85 33 85 A5
0A81:37 4C 00 80 00 00 00 00 4C
```

SpeedScript 3.2

See instructions in article on page 54 before typing in.

```
0801:0B 08 0A 00 9E 32 30 36 2E
0809:31 00 00 00 20 88 09 A9 90
0811:CB CD 6E 23 8D 6E 23 F0 D7
0819:03 20 37 09 20 C5 09 4C A0
0821:69 0A A5 26 8D 43 08 A5 AE
0829:27 8D 44 08 A5 9E 8D 46 42
0831:08 A5 9F 8D 47 08 A6 B5 D8
0839:F0 20 A9 00 8D 15 20 A0 A0
0841:00 B9 01 26 99 00 26 C8 24
0849:CC 15 20 D0 F4 EE 44 08 0A
0851:EE 47 08 E0 00 F0 07 CA 56
0859:D0 E0 A5 B4 D0 DE 60 A5 72
0861:B5 AA 05 B4 D0 01 60 18 46
0869:8A 65 27 8D 8B 08 A5 26 C3
0871:8D 8A 08 18 8A 65 9F 8D 24
0879:8E 08 A5 9E 8D 8D 08 E8 0D
0881:A4 B4 D0 04 F0 0D A0 FF 68
0889:B9 4F 24 99 50 24 88 C0 4D
0891:FF D0 F5 CE 8B 08 CE 8E 2A
0899:08 CA D0 EA 60 A9 28 85 A8
08A1:C3 85 14 A9 04 85 C4 A9 7B
08A9:D8 85 15 AD 11 20 85 FB 15
08B1:AD 12 20 85 FC A2 01 AD 9B
08B9:14 20 85 0C AD 1D 0D 8D D6
08C1:20 D0 A0 00 AD 2C 0D 91 F3
08C9:14 B1 FB 99 1D 20 C8 29 8D
08D1:7F C9 1F F0 13 C0 28 D0 C3
08D9:EB 88 B1 FB 29 7F C9 20 F2
08E1:F0 05 88 D0 F5 A0 27 C8 13
08E9:84 3B 88 B9 1D 20 91 C3 08
08F1:88 10 F8 A4 3B 18 98 65 84
08F9:FB 85 FB A5 FC 69 00 85 56
0901:FC E0 01 D0 03 8C 10 20 81
0909:C0 28 F0 08 A9 20 91 C3 D8
0911:C8 4C 09 09 18 A5 C3 69 94
0919:28 85 C3 85 14 90 04 E6 43
0921:C4 E6 15 E8 E0 19 F0 03 D0
0929:4C C3 08 A5 FB 8D 1B 20 1A
0931:A5 FC 8D 1C 20 60 AD 08 AE
0939:20 85 FB 8D 11 20 8D 17 50
0941:20 85 39 AD 09 20 85 FC 97
0949:8D 12 20 8D 18 20 85 3A 0A
0951:38 AD 0B 20 ED 09 20 AA CC
0959:A9 20 A0 FF C6 FC 91 FB A5
0961:C8 E6 FC 91 FB C8 D0 FB EA
0969:E6 FC CA D0 F6 91 FB 60 EA
0971:85 3B 84 3C A0 00 B1 3B 0D
0979:F0 06 20 D2 FF C8 D0 F6 72
0981:60 20 E4 FF F0 FB 60 A9 4A
0989:93 20 D2 FF A9 36 85 01 F9
0991:A9 00 8D 14 20 8D 08 20 D2
0999:8D 0A 20 8D 0C 20 8D 0E DB
09A1:20 8D B0 20 8D CF 20 A9 D4
09A9:24 18 69 01 8D 09 20 A9 8B
09B1:CF 8D 0B 20 A9 D0 8D 0D 2B
09B9:20 A9 FF 8D 0F 20 8D AE E1
09C1:20 4C 84 FF 20 E2 0D A9 D7
09C9:80 8D 8A 02 85 9D 20 5D 31
09D1:11 A9 06 8D 18 03 A9 0A 9A
09D9:8D 19 03 AD 08 20 85 39 39
09E1:AD 09 20 85 3A 20 F6 09 B2
09E9:A9 26 A0 1E 20 71 09 EE 18
09F1:13 20 60 EA EA 20 4E 0A CE
09F9:A9 12 A0 1E 20 71 09 A9 DD
0A01:00 8D 13 20 60 48 8A 48 5E
0A09:98 48 A9 7F 8D 0D DD AC B1
0A11:0D DD 10 03 4C 72 FE AD 2D
0A19:71 24 F0 06 A5 02 A0 00 E3
0A21:91 39 A9 02 85 0C 20 CC 0B
0A29:FF 20 4E 0A A9 F7 A0 1F 3D
0A31:20 71 09 20 A7 10 D0 09 FC
0A39:20 45 14 78 A9 7F 4C 66 03
0A41:FE 20 45 14 A2 FA 9A 20 1D
0A49:C5 09 4C 69 0A A2 27 A9 75
0A51:20 9D 00 04 CA 10 FA A9 53
0A59:13 4C D2 FF 48 29 80 4A 96
0A61:85 3B 68 29 3F 05 3B 60 8B
0A69:A0 00 8C 71 24 B1 39 85 56
0A71:02 A0 00 B1 39 49 80 91 4B
0A79:39 AD 71 24 49 01 8D 71 E0
0A81:24 20 9E 08 20 E4 FF D0 69
0A89:0D A5 A2 29 10 F0 F5 A9 4E
0A91:00 85 A2 4C 72 0A AA A0 D1
0A99:00 A5 02 91 39 8C 71 24 73
0AA1:E0 5F D0 0C 20 70 0C A9 5D
0AA9:20 A0 00 91 39 4C 69 0A E6
0AB1:AD 13 20 F0 07 8A 48 20 87
0AB9:F6 09 68 AA 8A C9 0D D0 A9
0AC1:02 A2 5F 8A 29 7F C9 20 0F
0AC9:90 4E E0 A0 D0 02 A2 20 D3
0AD1:8A 48 A0 00 B1 39 C9 1F 76
0AD9:F0 05 AD 14 20 F0 03 20 89
0AE1:38 10 68 20 5D 0A A0 00 79
0AE9:91 39 20 9E 08 38 A5 39 A8
0AF1:ED 17 20 85 3B A5 3A ED F1
0AF9:18 20 05 3B 90 0E A5 39 B7
0B01:69 00 8D 17 20 A5 3A 69 64
0B09:00 8D 18 20 E6 39 D0 02 47
0B11:E6 3A 20 B1 0B 4C 69 0A AE
0B19:8A AE 3B 0B DD 3B 0B F0 1B
0B21:06 CA D0 F8 4C 69 0A CA 7D
0B29:8A 0A AA A9 0A 48 A9 68 24
0B31:48 BD 64 0B 48 BD 63 0B 23
0B39:48 60 27 1D 9D 89 85 02 62
0B41:0C 8A 86 14 94 04 13 09 F5
0B49:93 87 8B 05 88 8C 16 91 01
0B51:11 9F 12 18 1A 10 1C 1E 03
0B59:06 01 0B 08 1F 03 83 0A AA
0B61:8D 07 66 0C 6F 0C 7A 0C 3A
0B69:B0 0C 10 0D 1D 0D 2C 0D 30
0B71:92 0D D9 0E 37 10 0D 0F 53
0B79:50 0F 9D 10 BE 10 E0 10 38
0B81:01 11 A3 11 CA 13 B5 12 02
0B89:19 14 2C 0D 92 0D 61 14 27
0B91:7B 15 21 16 F4 0C B3 16 85
0B99:A8 13 4F 1B F4 0E 31 16 BC
0BA1:E1 0D E8 1B EF 1D F4 0F A7
0BA9:EC 0F 8B 1C 1C 10 C7 1B F8
0BB1:20 0F 0C 38 A5 39 ED 11 9F
0BB9:20 A5 3A ED 12 20 B0 20 02
0BC1:38 AD 11 20 ED 08 20 85 D8
0BC9:3B AD 12 20 ED 09 20 05 06
0BD1:3B F0 0D A5 39 8D 11 20 FF
0BD9:A5 3A 8D 12 20 20 9E 08 EA
0BE1:38 AD 1B 20 E5 39 85 FB FF
0BE9:AD 1C 20 E5 3A 85 FC 05 27
0BF1:FB F0 02 B0 18 18 AD 11 1B
0BF9:20 6D 10 20 8D 11 20 AD 1E
0C01:12 20 69 00 8D 12 20 20 6C
0C09:9E 08 4C E1 0B 60 38 AD 12
0C11:17 20 ED 0A 20 85 3B AD 56
0C19:18 20 ED 0B 20 05 3B 90 CF
0C21:0C AD 0A 20 8D 17 20 AD A4
0C29:0B 20 8D 18 20 38 A5 39 68
0C31:ED 08 20 85 3B A5 3A ED 71
0C39:09 20 05 3B B0 0B AD 08 47
0C41:20 85 39 AD 09 20 85 3A DA
0C49:60 38 A5 39 ED 17 20 85 79
```

```
0C51:3B A5 3A ED 18 20 05 3B 1D
0C59:B0 01 60 AD 17 20 85 39 6E
0C61:AD 18 20 85 3A 60 E6 39 0D
0C69:D0 02 E6 3A 4C B1 0B A5 CF
0C71:39 D0 02 C6 3A C6 39 4C B2
0C79:B1 0B A5 39 85 FB A5 3A 17
0C81:85 FC C6 FC A0 FF B1 FB A8
0C89:C9 20 F0 04 C9 1F D0 03 5C
0C91:88 D0 F3 B1 FB C9 20 F0 F3
0C99:08 C9 1F F0 04 88 D0 F3 F2
0CA1:60 38 98 65 FB 85 39 A5 6F
0CA9:FC 69 00 85 3A 4C B1 0B 64
0CB1:A0 00 B1 39 C9 20 F0 08 9C
0CB9:C9 1F F0 04 C8 D0 F3 60 AE
0CC1:C8 D0 0B E6 3A A5 3A CD EC
0CC9:18 20 90 02 D0 19 B1 39 AF
0CD1:C9 20 F0 EC C9 1F F0 E8 59
0CD9:18 98 65 39 85 39 A5 3A FA
0CE1:69 00 85 3A 4C B1 0B AD EF
0CE9:17 20 85 39 AD 18 20 85 6D
0CF1:3A 4C B1 0B A9 00 8D 11 9A
0CF9:20 AD 18 20 38 E9 04 CD D1
0D01:09 20 B0 03 AD 09 20 8D 4D
0D09:12 20 20 9E 08 4C E8 0C 71
0D11:EE 1D 0D AD 1D 0D 29 0F E4
0D19:8D 1D 0D 60 0C EE 2C 0D 6A
0D21:AD 2C 0D 29 0F 8D 2C 0D 65
0D29:4C 9E 08 0B A5 39 85 FB DB
0D31:A5 3A 85 FC C6 FC A0 FF 98
0D39:B1 FB C9 2E F0 0C C9 21 B3
0D41:F0 08 C9 3F F0 04 C9 1F 4D
0D49:D0 04 88 D0 EB 60 B1 FB 2B
0D51:C9 2E F0 1B C9 21 F0 17 77
0D59:C9 3F F0 13 C9 1F F0 0F 33
0D61:88 D0 EB C6 FC A5 FC CD 24
0D69:08 20 B0 E2 4C 86 0D 84 EE
0D71:3B C6 3B C8 F0 0A B1 FB DD
0D79:C9 20 F0 F7 88 4C A2 0C E4
0D81:A4 3B 4C 4F 0D AD 08 20 8A
0D89:85 39 AD 09 20 85 3A 4C D2
0D91:B1 0B A0 00 B1 39 C9 2E 8F
0D99:F0 1D C9 21 F0 19 C9 3F 7D
0DA1:F0 15 C9 1F F0 11 C8 D0 D2
0DA9:EB E6 3A A5 3A CD 18 20 6E
0DB1:F0 E2 90 E0 4C E8 0C C8 04
0DB9:D0 0E E6 3A A5 3A CD 18 0A
0DC1:20 90 05 F0 03 4C E8 0C E6
0DC9:B1 39 C9 20 F0 E9 C9 2E 37
0DD1:F0 E5 C9 21 F0 E1 C9 3F 0B
0DD9:F0 DD C9 1F F0 D9 4C D9 70
0DE1:0C AD 0C 20 8D 8C 20 AD 7D
0DE9:0D 20 8D 8D 20 20 4E 0A 45
0DF1:A9 3A A0 1E 20 71 09 A9 E7
0DF9:01 8D 13 20 60 38 A5 39 C4
0E01:ED 08 20 85 3B A5 3A ED 45
0E09:09 20 05 3B D0 03 68 68 D1
0E11:60 A5 39 85 26 A5 3A 85 08
0E19:27 60 38 A5 39 85 9E 49 A8
0E21:FF 65 26 8D 90 20 A5 3A BE
0E29:85 9F 49 FF 65 27 8D 91 8D
0E31:20 A5 26 8D 92 20 A5 27 EB
0E39:8D 93 20 A5 9E 8D 94 20 D3
0E41:85 26 A5 9F 8D 95 20 85 E0
0E49:27 38 AD 91 20 6D 8D 20 C7
0E51:CD 0F 20 90 14 20 4E 0A EC
0E59:A9 49 A0 1E 20 71 09 A9 15
0E61:01 8D 13 20 A9 00 85 C6 E4
0E69:60 AD 8C 20 85 9E AD 8D 44
0E71:20 85 9F AD 90 20 85 B4 92
0E79:18 6D 8C 20 8D 8C 20 AD 1D
0E81:91 20 85 B5 6D 8D 20 8D E9
0E89:8D 20 A9 00 8D 1A D0 A9 C9
0E91:34 85 01 20 23 08 A9 36 0E
0E99:85 01 A9 01 8D 1A D0 AD 22
0EA1:92 20 85 26 AD 93 20 85 A3
0EA9:27 AD 94 20 85 9E AD 95 F0
0EB1:20 85 9F 38 AD 17 20 E5 A6
0EB9:9E 85 B4 AD 18 20 E5 9F A4
0EC1:85 B5 20 23 08 38 AD 17 D7
0EC9:20 ED 90 20 8D 17 20 AD 3C
0ED1:18 20 ED 91 20 8D 18 20 60
0ED9:60 20 FE 0D 20 70 0C 20 D9
0EE1:1B 0E 38 AD 8C 20 E9 01 AA
0EE9:8D 8C 20 AD 8D 20 E9 00 8F
0EF1:8D 8D 20 60 AD 8D 02 C9 B3
0EF9:05 D0 03 4C 7A 0F 20 67 A9
0F01:0C 20 FE 0D 20 70 0C 20 D8
0F09:1B 0E 4C E3 0E 20 E2 0D C3
0F11:A9 02 85 0C 20 4E 0A A9 ED
0F19:55 A0 1E 20 71 09 20 82 42
0F21:09 48 20 F6 09 68 29 BF 45
0F29:C9 17 D0 09 20 FE 0D 20 D3
0F31:7B 0C 4C 1B 0E C9 13 D0 D9
0F39:09 20 FE 0D 20 2D 0D 4C B0
0F41:1B 0E C9 10 D0 09 20 FE 94
0F49:0D 20 02 11 4C 1B 0E 60 92
0F51:38 A5 39 ED 11 20 85 3B 4A
0F59:A5 3A ED 12 20 05 3B F0 34
0F61:0B AD 11 20 85 39 AD 12 13
0F69:20 85 3A 60 AD 08 20 85 99
0F71:39 AD 09 20 85 3A 4C B1 1A
0F79:0B A5 39 85 FB 85 9E A5 DE
0F81:3A 85 FC 85 9F A0 00 B1 47
0F89:FB C9 20 D0 1E C8 D0 F7 D6
0F91:A5 FC CD 18 20 90 0F AD 0C
0F99:17 20 85 FB AD 18 20 85 4F
0FA1:FC A0 00 4C AC 0F E6 FC 97
0FA9:4C 88 0F 18 98 65 FB 85 4B
0FB1:26 A9 00 65 FC 85 27 38 28
0FB9:AD 17 20 E5 9E 85 B4 AD F8
0FC1:18 20 E5 9F 85 B5 38 A5 C3
0FC9:26 E5 9E 8D 90 20 A5 27 98
0FD1:E5 9F 8D 91 20 20 23 08 65
0FD9:38 AD 17 20 ED 90 20 8D E3
0FE1:17 20 AD 18 20 ED 91 20 C6
0FE9:8D 18 20 60 A9 FF 8D A9 F0
0FF1:20 4C 07 10 A9 05 8D A9 3B
0FF9:20 20 07 10 B1 39 C9 20 38
1001:D0 01 C8 4C D9 0C A9 00 F9
1009:8D AA 20 20 4E 10 A9 20 C6
1011:AE A9 20 A0 00 91 39 C8 82
1019:CA D0 FA 60 20 38 10 20 5A
1021:38 10 A9 1F A0 00 91 39 E9
1029:C8 91 39 20 9E 08 20 67 F7
1031:0C 20 67 0C 4C F5 0F A9 0F
1039:01 8D A9 20 A9 00 8D AA 87
1041:20 20 4E 10 A9 20 A0 00 53
1049:91 39 4C B1 0B 18 AD 17 50
1051:20 6D A9 20 AD 18 20 6D 8F
1059:AA 20 CD 0B 20 90 05 68 F6
1061:68 4C 9D 10 18 A5 39 85 CC
1069:26 6D A9 20 85 9E A5 3A 5B
1071:85 27 6D AA 20 85 9F 38 05
1079:AD 17 20 E5 26 85 B4 AD F6
1081:18 20 E5 27 85 B5 20 60 88
1089:08 18 AD 17 20 6D A9 20 05
1091:8D 17 20 AD 18 20 6D AA E3
1099:20 8D 18 20 60 AD 14 20 34
10A1:49 0E 8D 14 20 60 A9 64 17
10A9:A0 1E 20 71 09 20 9F FF C4
10B1:20 E4 FF F0 F8 C9 93 F0 31
10B9:F4 29 7F C9 59 60 A9 02 CC
10C1:85 0C 20 4E 0A A9 7B A0 1F
10C9:1E 20 71 09 20 A7 10 F0 70
10D1:03 4C F6 09 A2 FA 9A 20 4C
10D9:37 09 20 C8 09 4C 69 0A BE
10E1:A0 00 B1 39 C9 1F F0 11 D9
10E9:C8 D0 F7 E6 3A A5 3A CD BA
10F1:18 20 90 EE F0 EC 4C E8 E3
10F9:0C C8 D0 02 E6 3A 4C D9 1F
1101:0C A5 39 85 FB A5 3A 85 82
1109:FC C6 FC A0 FF B1 FB C9 8D
1111:1F F0 11 88 C0 FF D0 F5 47
1119:C6 FC A5 FC CD 09 20 B0 E5
1121:EC 4C 86 0D 38 98 65 FB 59
1129:85 FB A9 00 65 FC 85 FC 69
1131:38 A5 FB E5 39 85 3B A5 B2
1139:FC E5 3A 05 3B D0 12 84 B0
1141:3B 18 A5 FB E5 3B 85 FB 9E
1149:A5 FC E9 00 85 FC 4C 14 87
1151:11 A5 FB 85 39 A5 FC 85 1D
1159:3A 4C B1 0B 78 A9 00 8D 8A
1161:0E DC A9 1B 8D 11 D0 A9 A4
1169:7C 8D 14 03 A9 11 8D 15 A1
1171:03 A9 01 8D 1A D0 8D 12 B9
1179:D0 58 60 A9 3A A4 0C CD 0B
1181:12 D0 D0 05 A9 01 AC 1D 13
1189:0D 8C 21 D0 8D 12 D0 C9 A6
1191:01 F0 08 A9 01 8D 19 D0 4D
1199:4C BC FE A9 01 8D 19 D0 CC
11A1:4C 31 EA AD 8D 02 29 01 36
11A9:D0 03 20 E2 0D 20 4E 0A B6
11B1:A9 8A A0 1E 20 71 09 A0 BA
11B9:00 B1 39 49 80 91 39 20 E0
11C1:9E 08 A0 00 B1 39 49 80 CE
11C9:91 39 A9 02 85 0C 20 82 77
11D1:09 09 40 C9 57 D0 09 20 8F
11D9:01 12 20 B1 0C 4C 10 12 E3
11E1:C9 53 D0 09 20 01 12 20 B1
11E9:93 0D 4C 10 12 C9 50 D0 CC
11F1:09 20 01 12 20 E1 10 4C D6
11F9:10 12 20 B1 0B 4C F6 09 48
1201:A5 39 85 9E 8D 86 20 A5 4D
1209:3A 85 9F 8D 87 20 60 38 2E
1211:A5 39 85 26 ED 86 20 8D C0
1219:90 20 A5 3A 85 27 ED 87 12
1221:20 8D 91 20 20 32 0E AD 80
1229:86 20 85 39 AD 87 20 85 2E
1231:3A 20 9E 08 4C B8 11 A9 DF
1239:27 E5 D3 8D 19 20 A0 00 48
1241:A9 99 20 D2 FF A9 12 20 BC
1249:D2 FF A9 20 20 D2 FF A9 04
1251:9D 20 D2 FF 8C 1A 20 20 D3
1259:82 09 AC 1A 20 85 3B A9 6F
1261:92 20 D2 FF A9 20 20 D2 12
1269:FF A9 9D 20 D2 FF A9 9B 33
1271:20 D2 FF A5 3B C9 0D F0 C0
1279:32 C9 14 D0 0F 88 10 04 77
1281:C8 4C 41 12 A9 9D 20 D2 3D
1289:FF 4C 41 12 A5 3B 29 7F F5
1291:C9 20 90 AC CC 19 20 F0 7B
1299:A7 A5 3B 99 45 20 20 D2 B9
12A1:FF A9 00 85 D4 85 D8 C8 BF
12A9:4C 41 12 20 D2 FF A9 00 72
12B1:99 45 20 98 60 20 4E 0A AB
12B9:A9 BC A0 1E 20 71 09 20 D0
12C1:1C 13 B0 20 AD 08 20 85 24
12C9:FB AD 09 20 85 FC AE 17 0F
12D1:20 AC 18 20 A9 FB 20 D8 8C
12D9:FF B0 09 A5 90 29 BF D0 1F
12E1:03 4C 0A 14 F0 27 AD 1B B7
12E9:13 C9 08 90 06 20 96 1B 0D
12F1:4C 05 13 AD 1B 13 C9 01 74
12F9:F0 F9 20 4E 0A A9 C2 A0 1B
1301:1E 20 71 09 20 5D 11 A9 3F
1309:01 8D 13 20 60 20 4E 0A A1
1311:A9 CD A0 1E 20 71 09 4C 9A
1319:05 13 08 20 38 12 F0 16 8B
1321:A9 EC A0 1E 20 71 09 20 46
1329:82 09 A2 08 C9 44 F0 0C F4
1331:A2 01 C9 54 F0 06 20 F6 3E
1339:09 68 68 60 8E 1B 13 A9 C1
1341:01 A0 00 20 BA FF A0 00 29
1349:E0 01 F0 31 B9 45 20 C9 3E
1351:40 EA EA B9 46 20 C9 3A CB
1359:F0 23 B9 47 20 C9 3A F0 F9
1361:1C A9 30 8D 6D 20 A9 3A 58
1369:8D 6E 20 B9 45 20 99 6F DE
1371:20 C8 CC 1A 20 90 F4 F0 33
1379:F2 C8 4C 8A 13 B9 45 20 A7
1381:99 6D 20 C8 CC 1A 20 D0 40
1389:F4 8C 85 20 20 4E 0A A9 F7
1391:45 A0 20 20 71 09 AD 85 19
1399:20 A2 6D A0 20 20 BD FF 2D
13A1:A9 0D 20 D2 FF 4C 45 14 E0
13A9:20 4E 0A A9 AA A0 1E 20 83
13B1:71 09 20 82 09 20 5D 0A 8C
13B9:09 80 48 AD 14 20 F0 03 6E
13C1:20 38 10 20 F6 09 68 4C 03
13C9:E7 0A 38 A5 39 ED 08 20 79
13D1:85 3B A5 3A ED 09 20 05 BA
13D9:3B F0 04 A9 05 85 0C 20 6B
13E1:4E 0A A9 00 A0 1F 20 71 1A
13E9:09 20 1C 13 A5 0C C9 05 47
13F1:F0 03 20 37 09 A9 00 A6 5E
13F9:39 A4 3A 20 D5 FF 90 03 02
1401:4C E5 12 8E 17 20 8C 18 5E
1409:20 20 E7 FF 20 4E 0A A9 3E
1411:E2 A0 1E 20 71 09 4C 05 E5
1419:13 20 4E 0A A9 06 A0 1F 03
1421:20 71 09 20 1C 13 A9 01 5A
1429:AE 08 20 AC 09 20 20 D5 58
1431:FF A5 90 29 BF F0 D2 20 EE
1439:4E 0A A9 D5 A0 1E 20 71 CC
1441:09 4C 05 13 78 A9 00 8D CA
```

```
1449:1A D0 8D 20 D0 8D 21 D0 36
1451:A9 31 8D 14 03 A9 EA 8D AF
1459:15 03 A9 01 8D 0E DC 58 C8
1461:60 A9 93 20 D2 FF A9 0D 8F
1469:20 D2 FF 20 45 14 20 94 A7
1471:14 A9 0D 20 D2 FF A9 0E A9
1479:A0 1F 20 71 09 20 E4 FF 67
1481:C9 0D D0 F9 20 5D 11 4C 70
1489:F6 09 20 CC FF A9 01 20 09
1491:C3 FF 60 20 E7 FF A9 01 3D
1499:A2 08 A0 00 20 BA FF A9 BE
14A1:01 A2 2B A0 1F 20 BD FF 57
14A9:20 C0 FF B0 DD A2 01 20 B8
14B1:C6 FF 20 01 15 20 01 15 91
14B9:20 01 15 20 01 15 F0 CA DF
14C1:20 CC FF 20 E4 FF C9 20 0A
14C9:D0 03 20 82 09 A2 01 20 3C
14D1:C6 FF 20 01 15 48 20 01 7C
14D9:15 A8 68 AA 98 A0 37 84 A8
14E1:01 20 CD BD A0 36 84 01 10
14E9:A9 20 20 D2 FF 20 01 15 B7
14F1:F0 06 20 D2 FF 4C EE 14 68
14F9:A9 0D 20 D2 FF 4C B9 14 24
1501:20 CF FF 48 A5 90 29 BF 35
1509:F0 06 68 68 68 4C 8B 14 60
1511:68 60 A2 00 8E 88 20 8E 41
1519:89 20 8E 8A 20 8E 8B 20 FC
1521:38 B1 FB E9 30 90 2A C9 D3
1529:0A B0 26 0E 88 20 2E 89 D4
1531:20 0E 88 20 2E 89 20 0E E7
1539:88 20 2E 89 20 0E 88 20 78
1541:2E 89 20 0D 88 20 8D 88 22
1549:20 C8 D0 D4 E6 FC 4C 21 02
1551:15 F8 AD 88 20 0D 89 20 EA
1559:F0 1C 38 AD 88 20 E9 01 7E
1561:8D 88 20 AD 89 20 E9 00 F3
1569:8D 89 20 EE 8A 20 D0 03 29
1571:EE 8B 20 4C 53 15 AD 8A 93
1579:20 D8 60 38 AD 8C 20 ED 47
1581:0C 20 8D 8E 20 AD 8D 20 47
1589:ED 0D 20 8D 8F 20 0D 8E 70
1591:20 D0 10 20 4E 0A A9 34 26
1599:A0 1F 20 71 09 A9 01 8D 75
15A1:13 20 60 18 A5 39 85 26 2E
15A9:6D 8E 20 85 9E A5 3A 85 10
15B1:27 6D 8F 20 85 9F 38 AD 87
15B9:17 20 E5 26 85 B4 AD 18 09
15C1:20 E5 27 85 B5 18 65 9F 2B
15C9:CD 0B 20 90 10 20 4E 0A 52
15D1:A9 2C A0 1F 20 71 09 A9 64
15D9:01 8D 13 20 60 20 60 08 98
15E1:18 AD 8E 20 85 B4 6D 17 48
15E9:20 8D 17 20 AD 8F 20 85 DD
15F1:B5 6D 18 20 8D 18 20 A5 0A
15F9:39 85 9E A5 3A 85 9F AD 25
1601:0C 20 85 26 AD 0D 20 85 B5
1609:27 A9 00 8D 1A D0 A9 34 A7
1611:85 01 20 23 08 A9 36 85 4F
1619:01 A9 01 8D 1A D0 4C B1 87
1621:0B A0 00 B1 39 AA C8 B1 CD
1629:39 88 91 39 C8 8A 91 39 A6
1631:60 A0 00 B1 39 29 3F F0 AE
1639:0A C9 1B B0 06 B1 39 49 FD
1641:40 91 39 4C 67 0C 85 3B 8F
1649:29 3F 06 3B 24 3B 10 02 7E
1651:09 80 70 02 09 40 85 3B DF
1659:60 05 4B 42 05 3A 01 01 98
1661:01 00 01 00 50 1B 0E 0F 48
1669:12 8D AF 20 8A 48 98 48 E8
1671:38 AD 9F 20 ED A1 20 AD FE
1679:A0 20 ED A2 20 90 1F AD 15
1681:AF 20 20 D2 FF AD 8D 02 92
1689:29 01 8D 20 D0 D0 F6 A5 9B
1691:91 C9 7F D0 09 EE 20 D0 0B
1699:EA EA EA 4C 78 18 68 A8 B5
16A1:68 AA AD AF 20 60 20 4E 6E
16A9:0A A9 A4 A0 1F 4C 71 09 F9
16B1:4C 78 18 AD 1D 0D 8D 6F A7
16B9:24 A9 00 85 0C 8D 20 D0 62
16C1:8D 1D 0D 20 BD FF A9 04 E4
16C9:8D AA 20 A0 07 AD 8D 02 81
16D1:29 01 D0 03 4C 68 17 20 6F
16D9:4E 0A A9 47 A0 1F 20 71 8C
16E1:09 20 82 09 29 7F A2 03 0B
16E9:8E AA 20 C9 53 F0 56 A2 56
16F1:08 8E AA 20 C9 44 F0 22 80
16F9:C9 50 D0 B4 20 4E 0A A9 7C
1701:6D A0 1F 20 71 09 20 82 66
1709:09 38 E9 30 C9 04 90 A0 2A
1711:C9 50 B0 9C 8D AA 20 4C BB
1719:46 17 20 4E 0A A9 91 A0 D3
1721:1F 20 71 09 20 38 12 F0 9C
1729:87 AC 1A 20 A9 2C 99 45 02
1731:20 C8 A9 57 99 45 20 C8 37
1739:8C 1A 20 AD 1A 20 A2 45 EE
1741:A0 20 20 BD FF AD AA 20 D3
1749:A8 C9 04 90 1A C9 08 B0 80
1751:16 20 4E 0A A9 7C A0 1F 9C
1759:20 71 09 20 82 09 38 E9 A9
1761:30 A8 10 03 4C B1 16 A9 03
1769:01 AE AA 20 20 BA FF 20 27
1771:A7 16 A9 01 20 C3 FF 20 6E
1779:C0 FF A2 01 20 C9 FF 90 25
1781:03 4C 78 18 A2 00 8E 97 9E
1789:20 8E 96 20 8E AB 20 8E 32
1791:AC 20 8E 70 24 BD 5A 16 D9
1799:9D 98 20 E8 E0 0C D0 F5 1E
17A1:A9 FF 8D A6 20 8D A4 20 61
17A9:A2 04 BD 65 16 9D 1E 21 BC
17B1:CA D0 F7 AD 08 20 85 FB 1B
17B9:AD 09 20 85 FC A0 00 8C 54
17C1:A5 20 CC A4 20 F0 06 AD 2D
17C9:98 20 8D A5 20 B1 FB 10 28
17D1:03 4C 62 19 C9 1F F0 2C 4B
17D9:99 6E 21 C8 EE A5 20 AD 1D
17E1:A5 20 CD 99 20 90 E6 8C DB
17E9:16 20 B1 FB C9 20 F0 14 E5
17F1:CE A5 20 88 D0 F4 AC 16 47
17F9:20 4C 08 18 C8 B1 FB C9 9C
1801:20 F0 01 88 8C 16 20 98 BB
1809:38 65 FB 85 FB A5 FC 69 60
1811:00 85 FC A0 00 AD A6 20 70
1819:C9 FF D0 03 20 09 19 AD 7D
1821:A4 20 F0 03 20 31 19 38 2A
1829:2E A4 20 AD 16 20 8D 15 D9
1831:20 A9 6E 85 FD A9 21 85 60
1839:FE 20 33 1D 20 42 19 AD 13
1841:A6 20 CD 9C 20 90 03 20 B9
1849:97 18 38 A5 FB ED 17 20 92
1851:85 3B A5 FC ED 18 20 05 AC
1859:3B F0 38 90 36 AD 97 20 2B
1861:F0 0B A9 00 8D 96 20 8D 96
1869:9B 20 20 97 18 AD AA 20 D9
1871:C9 03 D0 03 20 82 09 20 CE
1879:E1 FF F0 FB A9 01 20 C3 CD
1881:FF 20 E7 FF AD 6F 24 8D B7
1889:1D 0D A2 FA 9A 20 F6 09 DB
1891:4C 69 0A 4C BE 17 38 AD B8
1899:9A 20 ED A6 20 A8 88 88 84
18A1:F0 08 30 06 20 54 19 88 BF
18A9:D0 FA AD 97 20 F0 11 8D A4
18B1:15 20 A9 6F 85 FD A9 23 3B
18B9:85 FE 20 31 19 20 33 1D 50
18C1:20 54 19 20 54 19 20 54 D7
18C9:19 EE 9F 20 D0 03 EE A0 49
18D1:20 AD 9E 20 D0 32 AD AA A8
18D9:20 C9 03 F0 2B C9 08 F0 7D
18E1:27 38 AD 9F 20 ED A1 20 7F
18E9:AD A0 20 ED A2 20 90 18 CA
18F1:20 CC FF 20 4E 0A A9 B3 09
18F9:A0 1F 20 71 09 20 82 09 34
1901:20 A7 16 A2 01 20 C9 FF 36
1909:AD 96 20 F0 11 8D 15 20 D3
1911:A9 6E 85 FD A9 22 85 FE 24
1919:20 31 19 20 33 1D AC 9B CF
1921:20 8C A6 20 88 F0 08 30 A5
1929:06 20 54 19 88 D0 FA 60 60
1931:A9 20 AC 98 20 8C A5 20 FD
1939:F0 06 20 6A 16 88 D0 FA 7F
1941:60 AC 9D 20 18 98 6D A6 29
1949:20 8D A6 20 20 54 19 88 D2
1951:D0 FA 60 A9 0D 20 6A 16 25
1959:AD 70 24 F0 03 20 6A 16 95
1961:60 8D A8 20 29 7F 20 47 0D
1969:16 AE AD 19 DD AD 19 F0 62
1971:09 CA D0 F8 CE A5 20 4C 1E
1979:BE 1A CA 8A 0A AA 8C A7 4F
1981:20 A9 19 48 A9 90 48 BD B3
1989:C1 19 48 BD C0 19 48 60 23
1991:38 AD A7 20 65 FB 85 FB 64
1999:A5 FC 69 00 85 FC 4C BE 82
19A1:17 B1 FB C9 1F F0 01 88 2F
19A9:8C A7 20 60 12 57 41 4C D2
19B1:52 54 42 53 4E 48 46 40 FF
19B9:50 3F 58 4D 49 47 4A 20 DF
19C1:1A 32 1A 3B 1A 45 1A 4F ED
19C9:1A 59 1A 63 1A 6D 1A 7C 10
19D1:1A 9E 1A 06 1A 16 1A F6 B0
19D9:19 EC 19 E3 19 B7 1A E0 F1
19E1:1A 29 1A C8 A9 00 8D A4 48
19E9:20 4C A2 19 C8 20 13 15 27
19F1:8D A3 20 4C A2 19 C8 20 C7
19F9:13 15 8D A1 20 AD 8B 20 B5
1A01:8D A2 20 4C A2 19 C8 20 98
1A09:13 15 8D 9F 20 AD 8B 20 A6
1A11:8D A0 20 4C A2 19 C8 20 28
1A19:13 15 8D 9A 20 4C A2 19 08
1A21:A9 00 8D 9E 20 C8 4C A2 25
1A29:19 A9 0A 8D 70 24 C8 4C 60
1A31:A2 19 C8 A9 01 8D AB 20 66
1A39:4C A2 19 C8 20 13 15 8D F0
1A41:98 20 4C A2 19 C8 20 13 BC
1A49:15 8D 99 20 4C A2 19 C8 88
1A51:20 13 15 8D 9B 20 4C A2 6E
1A59:19 C8 20 13 15 8D 9C 20 B9
1A61:4C A2 19 C8 20 13 15 8D 19
1A69:9D 20 4C A2 19 AC A7 20 13
1A71:C8 98 48 20 97 18 68 A8 D1
1A79:8C A7 20 60 20 97 1A 88 04
1A81:8C 96 20 A0 01 B1 FB 99 10
1A89:6D 22 C8 CC 96 20 90 F5 2F
1A91:F0 F3 C8 4C A2 19 C8 B1 D5
1A99:FB C9 1F D0 F9 60 20 97 58
1AA1:1A 88 8C 97 20 A0 01 B1 47
1AA9:FB 99 6E 23 C8 CC 97 20 0B
1AB1:90 F5 F0 F3 4C A2 19 20 48
1AB9:97 1A 4C A2 19 C8 B1 FB 3F
1AC1:C9 3D F0 07 88 AD A8 20 25
1AC9:4C D9 17 C8 20 13 15 48 C9
1AD1:AD A8 20 29 7F AA 68 9D B2
1AD9:EE 20 20 A2 19 4C 91 19 F1
1AE1:C8 A2 08 B1 FB 29 3F C9 0C
1AE9:04 F0 09 A2 01 C9 14 F0 EF
1AF1:03 4C B1 16 8E 1B 13 C8 22
1AF9:B1 FB C9 3A F0 03 4C B1 C0
1B01:16 C8 B1 FB C9 1F F0 09 20
1B09:20 47 16 99 6A 20 4C 02 EB
1B11:1B 98 38 E9 03 A2 6D A0 BE
1B19:20 20 BD FF 20 CC FF A9 FC
1B21:02 20 C3 FF A9 02 AE 1B A6
1B29:13 A0 00 20 BA FF 20 37 60
1B31:09 A9 00 A6 39 A4 3A 20 B1
1B39:D5 FF 90 03 4C B1 16 8E 80
1B41:17 20 8C 18 20 68 68 A2 34
1B49:01 20 C9 FF 4C B4 17 20 C4
1B51:E7 FF A9 00 20 BD FF A9 52
1B59:0F A2 08 A0 0F 20 BA FF 39
1B61:20 C0 FF 90 0B A9 0F 20 1E
1B69:C3 FF 20 E7 FF 4C F6 09 2C
1B71:20 4E 0A A9 1D A0 1F 20 F0
1B79:71 09 20 38 12 F0 16 A2 55
1B81:0F 20 C9 FF B0 DF A9 45 1E
1B89:A0 20 20 71 09 A9 0D 20 5C
1B91:D2 FF 20 CC FF 20 E7 FF 52
1B99:A9 00 20 BD FF A9 0F A2 EB
1BA1:08 A0 0F 20 BA FF 20 C0 BE
1BA9:FF B0 BA 20 4E 0A A2 0F 54
1BB1:20 C6 FF 20 38 12 20 CC C2
1BB9:FF A9 0F 20 C3 FF 20 E7 84
1BC1:FF A9 01 8D 13 20 60 20 55
1BC9:F0 1B AD B0 20 F0 16 20 11
1BD1:93 1C 20 16 1C AD AE 20 53
1BD9:C9 FF F0 09 20 B6 1C 20 D7
1BE1:9E 08 4C D3 1B 4C F6 09 31
1BE9:AD 8D 02 C9 05 D0 26 20 0F
1BF1:4E 0A A9 D5 A0 1F 20 71 97
1BF9:09 20 38 12 8D B0 20 D0 25
1C01:03 4C F6 09 A0 00 B9 45 FA
1C09:20 99 B1 20 C8 CC 1A 20 BD
1C11:D0 F4 4C F6 09 A5 39 85 BE
1C19:FB A5 3A 85 FC A9 FF 8D 74
1C21:AE 20 A0 01 A2 00 AD B0 FD
1C29:20 F0 50 BD B1 20 20 5D 3F
1C31:0A D1 FB F0 02 A2 FF C8 D4
1C39:D0 0B E6 FC A5 FC CD 18 1E
```

```
1C41:20 F0 02 B0 36 E8 EC B0 F0
1C49:20 D0 E0 18 98 65 FB 85 3B
1C51:3B A5 FC 69 00 85 3C AD 03
1C59:17 20 C5 3B AD 18 20 E5 85
1C61:3C 90 18 38 A5 3B ED B0 09
1C69:20 85 39 8D AD 20 A5 3C 88
1C71:E9 00 85 3A 8D AE 20 20 7A
1C79:B1 0B 60 20 4E 0A A9 DF 29
1C81:A0 1F 20 71 09 A9 01 8D 6B
1C89:13 20 60 AD 8D 02 C9 05 47
1C91:D0 23 20 4E 0A A9 E9 A0 4F
1C99:1F 20 71 09 20 38 12 8D BB
1CA1:CF 20 F0 0E A0 00 B9 45 86
1CA9:20 99 D0 20 C8 CC 1A 20 42
1CB1:D0 F4 4C F6 09 38 A5 39 36
1CB9:85 9E ED AD 20 85 3B A5 28
1CC1:3A 85 9F ED AE 20 05 3B 86
1CC9:D0 65 A9 FF 8D AE 20 18 78
1CD1:AD B0 20 65 39 85 26 A9 3D
1CD9:00 65 3A 85 27 38 AD 17 97
1CE1:20 E5 9E 85 B4 AD 18 20 7C
1CE9:E5 9F 85 B5 20 23 08 38 DE
1CF1:AD 17 20 ED B0 20 8D 17 E1
1CF9:20 AD 18 20 E9 00 8D 18 35
1D01:20 AD CF 20 F0 29 8D A9 A3
1D09:20 A9 00 8D AA 20 20 4E FA
1D11:10 A0 00 B9 D0 20 20 5D BB
1D19:0A 91 39 C8 CC CF 20 D0 27
1D21:F2 18 A5 39 6D CF 20 85 93
1D29:39 A5 3A 69 00 85 3A 4C 1E
1D31:B1 0B A0 00 CC 15 20 F0 07
1D39:20 B1 FD 30 1D 20 47 16 C0
1D41:20 D0 1D 20 6A 16 AD AC 19
1D49:20 F0 0A A9 08 20 6A 16 57
1D51:A9 5F 20 6A 16 C8 4C 35 84
1D59:1D 60 8C A7 20 29 7F 8D 78
1D61:A8 20 20 47 16 C9 43 D0 9F
1D69:1B 38 AD A3 20 ED 15 20 32
1D71:4A 38 ED 98 20 A8 A9 20 3D
1D79:20 6A 16 88 D0 FA AC A7 1D
1D81:20 4C 56 1D C9 45 D0 11 91
1D89:38 AD 99 20 ED 15 20 38 BC
1D91:ED 98 20 A8 A9 20 4C 79 57
1D99:1D C9 55 D0 0B AD AC 20 15
1DA1:49 01 8D AC 20 4C 56 1D 39
1DA9:C9 23 D0 17 AE 9F 20 AD FE
1DB1:A0 20 A0 37 84 01 20 CD 02
1DB9:BD A0 36 84 01 AC A7 20 34
1DC1:4C 56 1D AE A8 20 BD EE 76
1DC9:20 20 6A 16 4C 56 1D AE 6F
1DD1:AB 20 F0 1A 85 3B 29 7F 94
1DD9:C9 41 90 12 C9 5B B0 0E A7
1DE1:AA A5 3B 29 80 49 80 4A 49
1DE9:4A 85 3B 8A 05 3B 60 20 B0
1DF1:4E 0A 38 AD 0A 20 ED 17 7B
1DF9:20 AA AD 0B 20 ED 18 20 5E
1E01:A0 37 84 01 20 CD BD A0 50
1E09:36 84 01 A9 01 8D 13 20 C0
1E11:60 08 0E 9B 92 D3 50 45 C4
1E19:45 44 D3 43 52 49 50 54 64
1E21:20 33 2E 32 00 20 42 59 81
1E29:20 C3 48 41 52 4C 45 53 25
1E31:20 C2 52 41 4E 4E 4F 4E 25
1E39:00 C2 55 46 46 45 52 20 41
1E41:C3 4C 45 41 52 45 44 00 5F
1E49:C2 55 46 46 45 52 20 C6 E3
1E51:55 4C 4C 00 C4 45 4C 45 ED
1E59:54 45 20 28 D3 2C D7 2C C2
1E61:D0 29 00 3A 20 C1 52 45 E5
1E69:20 59 4F 55 20 53 55 52 96
1E71:45 3F 20 28 D9 2F CE 29 F8
1E79:3A 00 C5 D2 C1 D3 C5 20 C1
1E81:C1 CC CC 20 D4 C5 D8 D4 B1
1E89:00 C5 52 41 53 45 20 28 AD
1E91:D3 2C D7 2C D0 29 3A 20 40
1E99:12 D2 C5 D4 D5 D2 CE 92 C3
1EA1:20 54 4F 20 45 58 49 54 61
1EA9:00 D0 52 45 53 53 20 46 27
1EB1:4F 52 4D 41 54 20 4B 45 E6
1EB9:59 3A 00 D3 41 56 45 3A 96
1EC1:00 D4 41 50 45 20 C5 D2 69
1EC9:D2 CF D2 00 D3 54 4F 50 9C
1ED1:50 45 44 00 D6 45 52 49 C9
1ED9:46 59 20 C5 52 52 4F 52 BC
1EE1:00 CE 4F 20 45 52 52 4F 25
1EE9:52 53 00 93 20 12 D4 92 E2
1EF1:41 50 45 20 4F 52 20 12 A3
1EF9:C4 92 49 53 4B 3F 00 CC BF
1F01:4F 41 44 3A 00 D6 45 52 9B
1F09:49 46 59 3A 00 D0 52 45 79
1F11:53 53 20 12 D2 C5 D4 D5 20
1F19:D2 CE 92 00 C4 49 53 4B 04
1F21:20 43 4F 4D 4D 41 4E 44 4F
1F29:3A 00 24 CE 4F 20 D2 4F E5
1F31:4F 4D 00 CE 4F 20 54 45 40
1F39:58 54 20 49 4E 20 42 55 1E
1F41:46 46 45 52 2E 00 93 D0 6B
1F49:52 49 4E 54 20 54 4F 3A 3D
1F51:20 12 D3 92 43 52 45 45 FA
1F59:4E 2C 12 C4 92 49 53 4B 04
1F61:2C 12 D0 92 52 49 4E 54 26
1F69:45 52 3F 00 C4 45 56 49 F7
1F71:43 45 20 4E 55 4D 42 45 35
1F79:52 3F 00 D3 45 43 4F 4E 12
1F81:44 41 52 59 20 C1 44 44 E6
1F89:52 45 53 53 20 23 3F 00 ED
1F91:D0 52 49 4E 54 20 54 4F F5
1F99:20 46 49 4C 45 4E 41 4D 9A
1FA1:45 3A 00 93 D0 52 49 4E FA
1FA9:54 49 4E 47 2E 2E 2E 0D 36
1FB1:0D 00 C9 4E 53 45 52 54 3D
1FB9:20 4E 45 58 54 20 53 48 DB
1FC1:45 45 54 2C 20 50 52 45 6D
1FC9:53 53 20 12 D2 C5 D4 D5 D8
1FD1:D2 CE 92 00 C8 55 4E 54 0C
1FD9:20 46 4F 52 3A 00 CE 4F 87
1FE1:54 20 C6 4F 55 4E 44 00 8C
1FE9:D2 45 50 4C 41 43 45 20 73
1FF1:57 49 54 48 3A 00 C5 D8 73
1FF9:C9 D4 20 D3 50 45 45 44 F9
2001:D3 43 52 49 50 54 00 00 AE
```

SpeedScript 3.2 File Converter

```
JC 10 PRINT"{CLR}{RVS}{N}
      {2 SPACES}SPEEDSCRIPT FI
      LE CONVERSION PROGRAM
      {3 SPACES}"
BF 20 GOSUB320
SS 30 INPUT"{DOWN}INPUT FILE N
      AME";I$
BB 40 IFI$=""THEN30
DH 50 INPUT"{DOWN}OUTPUT FILE
      {SPACE}NAME";O$
MC 60 PRINT"{DOWN}{RVS}D{OFF}I
      SK, {RVS}S{OFF}CREEN,
      {RVS}P{OFF}RINTER, {RVS}
      O{OFF}THER"
KG 70 GETA$:IFA$=""THEN70
HK 80 DV=-(A$="T")-3*(A$="S")-
      4*(A$="P")-8*(A$="D"):SA
      =7
FS 90 IFDV=0THENINPUT"DEVICE N
      UMBER";DV:INPUT"SECONDAR
      Y ADDRESS";SA
RG 100 PRINT"{2 DOWN}WHICH CON
       VERSION:"
GX 110 PRINT"{DOWN}1) SPEEDSCR
       IPT TO COMMODORE ASCII"
MD 120 PRINT"{DOWN}2) SPEEDSCR
       IPT TO TRUE ASCII"
PQ 130 PRINT"{DOWN}3) COMMODOR
       E ASCII TO SPEEDSCRIPT"
RB 140 GETP$:IFP$<"1"ORP$>"3"T
       HEN140
FP 150 ADR=828+VAL(P$)*3-3
BM 160 OPEN15,8,15,"I0":REM RE
       MOVE ,"I0" IF YOU'VE CH
       ANGED THE DRIVE'S SPEED
SD 170 OPEN1,8,3,I$:INPUT#15,E
       N,EM$:F$=I$:IFEN=0THEN2
       00
EQ 180 PRINT"{DOWN}DISK ERROR
       {SPACE}FOR ";F$:PRINTEM
       $
PG 190 PRINT"{3 DOWN}RUN{3 UP}
       ":CLOSE1:CLOSE2:CLOSE15
       :END
JX 200 IFDV<>8THENOPEN2,DV,SA,
       O$:GOTO290
FR 210 EX$=",S,W":IFP$="3"THEN
       EX$=",P,W"
AB 220 OPEN2,DV,SA,"0:"+O$+EX$
       :INPUT#15,EN,EM$:F$=O$
XM 230 IFEN=0THEN290
FS 240 IFEN<>63THEN180
BM 250 PRINT"{DOWN}";O$;" EXIS
       TS... REPLACE? {RVS}Y
       {OFF}/{RVS}N{OFF}:"
BR 260 GETA$:IFA$<>"Y"ANDA$<>"
       N"THEN260
SC 270 IFA$="N"THEN190
BM 280 PRINT#15,"S0:"+O$:CLOSE
       2:GOTO220
FC 290 SYS(ADR):IF(PEEK(144)AN
       D191)=0THENPRINT"{DOWN}
       DONE.":GOTO190
MK 300 PRINT"I/O ERROR DURING
       {SPACE}CONVERSION.":INP
       UT#15,EN,EM$:IFEN<>0THE
       N180
CJ 310 GOTO190
CF 320 FORI=828TO1001:READA:PO
       KEI,A:CK=CK+A:NEXT:IFCK
       =21584THENRETURN
DA 330 PRINT"{RVS}ERROR IN DAT
       A STATEMENTS.";END
XC 340 DATA 076,069,003,076,12
       2,003
QE 350 DATA 076,174,003,032,22
       5,255
CK 360 DATA 240,018,032,216,00
       3,032
SD 370 DATA 095,003,032,183,25
       5,072
ME 380 DATA 032,224,003,104,04
       1,064
CG 390 DATA 240,233,076,204,25
       5,133
MM 400 DATA 251,041,064,010,00
       5,251
MG 410 DATA 041,191,133,251,04
       1,032
PQ 420 DATA 073,032,010,005,25
       1,201
GE 430 DATA 095,208,002,169,01
       3,133
DD 440 DATA 251,096,032,225,25
       5,240
QP 450 DATA 221,032,216,003,03
       2,095
SM 460 DATA 003,041,127,201,06
       5,144
AB 470 DATA 018,201,091,176,01
       4,170
HM 480 DATA 165,251,041,128,07
       3,128
GR 490 DATA 074,074,133,251,13
       8,005
KK 500 DATA 251,133,251,032,18
       3,255
RH 510 DATA 072,032,224,003,10
       4,041
BF 520 DATA 064,240,207,076,20
       4,255
XP 530 DATA 032,225,255,240,16
       9,032
KE 540 DATA 216,003,201,013,20
       8,002
CF 550 DATA 169,031,072,041,12
       8,074
BK 560 DATA 133,251,104,041,06
       3,005
GE 570 DATA 251,133,251,032,18
       3,255
KC 580 DATA 072,032,224,003,10
       4,041
MC 590 DATA 064,240,217,076,20
       4,255
CP 600 DATA 162,001,032,198,25
       5,076
SX 610 DATA 207,255,162,002,03
       2,201
RC 620 DATA 255,165,251,076,21
       0,255
```

Dazzlers

Article on page 88.

Program 1: Dazzlers—Main Program

```
QP 1 REM DAZZLER MAIN PROGRAM
KR 2 REM
DM 10 FORN=49152TO49176:READK:
      POKEN,K:NEXT
JD 20 DATA 162,0,173,18,208,20
      1,203,208,249
QX 30 DATA 254,0,216,254,0,217
      ,254,0,218
KE 40 DATA 254,0,219,232,208,2
      41,96
GX 50 POKE53280,0:PRINTCHR$(14
      7)
CH 60 FORN=1024TO2023:POKEN,16
      0:NEXT:GOSUB100
FX 70 SYS49152
GF 80 FORN=1TOTD:NEXT:GETA$:IF
      A$=""THEN70
SK 90 POKE 53280,14:PRINT CHR$
      (147):END
```

Program 2: Dazzlers—Subroutine 1

```
KM 98 REM SUBROUTINE 1
RK 99 REM
XS 100 FORR=0TO12:C=R
HC 110 FORL=0TO19:C=(C+1)AND15
AK 120 POKE55296+40*R+L,C:POKE
       55335+40*R-L,C
SR 130 POKE56256-40*R+L,C:POKE
       56295-40*R-L,C:NEXT:NEX
       T
QB 140 TD=50:RETURN
```

Program 3: Dazzlers—Subroutine 2

```
KP 98 REM SUBROUTINE 2
RK 99 REM
XS 100 FORR=0TO12:C=R
HC 110 FORL=0TO19:C=(C+1)AND15
KB 120 POKE55316+40*R+L,C:POKE
       55315+40*R-L,C
JD 130 POKE56276-40*R+L,C:POKE
       56275-40*R-L,C:NEXT:NEX
       T
QB 140 TD=50:RETURN
```

Program 4: Dazzlers—Subroutine 3

```
KJ 98 REM SUBROUTINE 3
RK 99 REM
ME 100 FORR=0TO6:C=R
CE 110 FORL=0TO9:C=(C+1)AND15
ES 120 D=55296+40*R+L:POKED,C:
       POKED+20,C:POKED+480,C:
       POKED+500,C
GJ 130 D=55315+40*R-L:POKED,C:
       POKED+20,C:POKED+480,C:
       POKED+500,C
AC 140 D=55776-40*R+L:POKED,C:
       POKED+20,C:POKED+480,C:
       POKED+500,C
KF 150 D=55795-40*R-L:POKED,C:
       POKED+20,C:POKED+480,C:
       POKED+500,C:NEXT:NEXT
EH 160 TD=50:RETURN
```

Program 5: Dazzlers—Subroutine 4

```
KK 98 REM SUBROUTINE 4
RK 99 REM
PG 100 FORC=0TO11:N=55295+41*C
MG 110 FORK=CTO39-C:N=N+1:POKE
       N,C:NEXT
CA 120 FORK=CTO23-C:N=N+40:POK
       EN,C:NEXT
JP 130 FORK=CTO38-C:N=N-1:POKE
       N,C:NEXT
ER 140 FORK=CTO22-C:N=N-40:POK
       EN,C:NEXT:NEXT
FJ 150 FORN=55788TO55803:POKEN
       ,12:NEXT
CC 160 TD=100:RETURN
```

Program 6: Dazzlers—Subroutine 5

```
KS 98 REM SUBROUTINE 5
RK 99 REM
ME 100 FORC=0TO11:N=55295+41*C
       :B=1
KP 110 FORK=CTO39-C:N=N+1:B=(B
       +1)AND15:POKEN,B:NEXT:B
       =2
SG 120 FORK=CTO23-C:N=N+40:B=(
       B+1)AND15:POKEN,B:NEXT:
       B=1
KG 130 FORK=CTO38-C:N=N-1:B=(B
       +1)AND15:POKEN,B:NEXT:B
       =2
SH 140 FORK=CTO22-C:N=N-40:B=(
       B+1)AND15:POKEN,B:NEXT:
       NEXT:B=17
RP 150 FORN=55788TO55803:B=(B+
       1)AND15:POKEN,B:NEXT
KE 160 TD=80:RETURN
```

Program 7: Dazzlers—ML Source Code

```
;DAZZLER.ASM
;
;THIS ROUTINE INCREMENTS EVERY BYTE
; IN COLOR RAM.
;
*=$C000    ;SYS ADDRESS = 49152
;
      LDX #0       ;INIT. BYTE COUNTER
WAIT  LDA $D012    ;GET RASTER LINE
      CMP #203     ;RASTER LINE 203 ?
      BNE WAIT     ;NO, TRY AGAIN
NEXT  INC $D800,X  ;INC. 1ST PAGE BYTE
      INC $D900,X  ;INC. 2ND PAGE BYTE
      INC $DA00,X  ;INC. 3RD PAGE BYTE
      INC $DB00,X  ;INC. 4TH PAGE BYTE
      INX          ;INC. BYTE COUNTER
      BNE NEXT     ;LOOP UNTIL DONE
      RTS          ;RETURN TO BASIC
.END
```

Gameports

Article on page 90.

Program 1: Gameport Test—64 Version

```
RA 100 PRINT CHR$(147);CHR$(14
       2)
FC 110 PRINT"JOYSTICK/PADDLE T
       EST"
GC 120 PRINT "PRESS <F1> TO ST
       OP"
JR 130 DATA F,R,L,D,U
RH 140 DATA 16,8,4,2,1
BX 150 DIM C(5),B(5)
SG 160 FOR J=1 TO 5:READ C$:C(
       J)=ASC(C$):NEXT J
XA 170 FOR J=1 TO 5:READ B(J):
       NEXT J
DR 180 PRINT CHR$(19):PRINT:PR
       INT
JS 190 G=64
XC 200 FOR P=0 TO 1
DE 210 PRINT
GQ 220 POKE 56333,127
SJ 230 R=PEEK(56321-P)
CJ 240 POKE 56320,G
PJ 250 G=G+G
GB 260 X=PEEK(54297)
HD 270 Y=PEEK(54298)
RF 280 POKE 56333,129
JG 290 FOR B=1 TO 5
QA 300 C=C(B):IF R AND B(B) TH
       EN C=32
GX 310 PRINT CHR$(C);
XG 320 NEXT B
KJ 330 PRINT " PORT:";P+1;"PAD
       DLES:";
MS 340 PRINT RIGHT$("
       {2 SPACES}"+STR$(X),4);
SS 350 PRINT RIGHT$("
       {2 SPACES}"+STR$(Y),4)
JA 360 NEXT P
PX 370 GET X$:IF X$="" GOTO 18
       0
CM 380 IF ASC(X$)<>133 GOTO 18
       0
```

Program 2: Gameport Test—128 Version

```
RA 100 PRINT CHR$(147);CHR$(14
       2)
FC 110 PRINT"JOYSTICK/PADDLE T
       EST"
GC 120 PRINT "PRESS <F1> TO ST
       OP"
JR 130 KEY 1,CHR$(133)
DR 180 PRINT CHR$(19):PRINT:PR
       INT
MF 200 FOR P=1 TO 2
DE 210 PRINT
MQ 220 P1=P*2-1
RC 230 J=JOY(P):Y=32
XR 240 IF J>127 THEN J=J-128:Y
       =70
DA 250 PRINT RIGHT$("
       {2 SPACES}"+STR$(J),3);
       CHR$(Y);
CP 260 PRINT " PORT";P;"PADDLE
       S:";
CQ 270 FOR B=P1 TO P1+1
CR 280 X=POT(B):Y=32
KQ 290 IF X>255 THEN X=X-256:Y
       =66
XS 300 PRINT RIGHT$("
       {2 SPACES}"+STR$(X),4);
       CHR$(Y);
DF 310 NEXT B
CP 320 PRINT
JA 360 NEXT P
AB 370 GET X$:IF ASC(X$)<>133
       {SPACE}GOTO 180
```

Power BASIC: Easy ML Line Drawing—Walking Line Demo

Article on page 83.

```
RQ 10 PRINT:PRINT"READING MACH
      INE CODE...";
AE 20 T=0:FORN=4864TO5311:READ
      K:POKEN,K:T=T+K:NEXT
KF 30 IFT=40668THEN50
PM 40 PRINT:PRINT"***** ERROR
      {SPACE}IN DATA STATEMENT
      S *****":PRINT:END
QR 50 POKE5392,INT(RND(0)*256)
      :POKE5393,INT(RND(0)*256
      )
AH 60 POKE5394,INT(RND(0)*256)
      :POKE5395,INT(RND(0)*256
      )
BM 70 COLOR0,16:COLOR1,3:COLOR
      2,6:COLOR3,7:COLOR4,12:G
      RAPHIC3,1
```

```
DC 80 SYS4864
SX 90 COLOR0,12:COLOR1,14:COLO
      R4,14:GRAPHIC0,1:END
QB 100 DATA 169,0,141,50,17,14
       1,52,17
QC 110 DATA 141,54,17,141,56,1
       7,141,25
JG 120 DATA 21,141,21,21,169,2
       55,141,20
GK 130 DATA 21,160,0,153,192,2
       0,200,192
MB 140 DATA 80,208,248,169,5,1
       41,192,20
XK 150 DATA 141,211,20,169,30,
       141,230,20
PP 160 DATA 169,8,141,249,20,1
       69,2,141
RF 170 DATA 26,21,141,12,21,14
       1,14,21
QE 180 DATA 141,13,21,141,15,2
       1,169,0
PG 190 DATA 133,131,172,21,21,
       200,192,18
JE 200 DATA 208,2,160,0,140,21
       ,21,185
JK 210 DATA 192,20,141,49,17,1
       85,230,20
CD 220 DATA 141,53,17,185,211,
       20,141,51
EK 230 DATA 17,185,249,20,141,
       55,17,32
EH 240 DATA 114,175,173,26,21,
       133,131,174
JD 250 DATA 20,21,232,224,18,2
       08,2,162
KD 260 DATA 0,142,20,21,189,19
       2,20,141
BK 270 DATA 49,17,189,230,20,1
       41,53,17
XK 280 DATA 189,211,20,141,51,
       17,189,249
MG 290 DATA 20,141,55,17,32,11
       4,175,174
QD 300 DATA 20,21,169,160,141,
       27,21,189
SA 310 DATA 192,20,141,22,21,1
       73,12,21
AF 320 DATA 141,24,21,32,75,20
       ,173,24
FD 330 DATA 21,141,12,21,173,2
       2,21,157
MD 340 DATA 193,20,189,230,20,
       141,22,21
HF 350 DATA 173,14,21,141,24,2
       1,32,75
EC 360 DATA 20,173,24,21,141,1
       4,21,173
AR 370 DATA 22,21,157,231,20,1
       69,200,141
KJ 380 DATA 27,21,189,211,20,1
       41,22,21
MA 390 DATA 173,13,21,141,24,2
       1,32,75
DC 400 DATA 20,173,24,21,141,1
       3,21,173
KC 410 DATA 22,21,157,212,20,1
       89,249,20
CF 420 DATA 141,22,21,173,15,2
       1,141,24
SF 430 DATA 21,32,75,20,173,24
       ,21,141
SX 440 DATA 15,21,173,22,21,15
       7,250,20
QS 450 DATA 169,18,141,23,21,2
       06,23,21
QM 460 DATA 236,23,21,208,24,1
       89,193,20
BG 470 DATA 141,192,20,189,231
       ,20,141,230
PQ 480 DATA 20,189,212,20,141,
       211,20,189
GQ 490 DATA 250,20,141,249,20,
       32,159,255
KK 500 DATA 32,228,255,201,0,2
       40,1,96
KB 510 DATA 76,70,19,173,22,21
       ,24,109
EA 520 DATA 24,21,205,27,21,14
       4,56,238
RH 530 DATA 25,21,173,25,21,20
       1,8,208
QX 540 DATA 20,169,1,141,25,21
       ,238,26
FQ 550 DATA 21,173,26,21,201,4
       ,208,5
EQ 560 DATA 169,1,141,26,21,32
       ,154,20
KR 570 DATA 141,23,21,173,24,2
       1,48,9
JF 580 DATA 169,0,56,237,23,21
       ,141,23
FC 590 DATA 21,173,23,21,141,2
       4,21,173
BD 600 DATA 24,21,24,109,22,21
       ,141,22
KJ 610 DATA 21,96,142,23,21,24
       ,162,3
KR 620 DATA 189,16,21,202,125,
       16,21,157
FC 630 DATA 16,21,202,16,247,1
       62,3,254
XP 640 DATA 16,21,208,3,202,16
       ,248,174
JS 650 DATA 23,21,41,3,24,105,
       2,96
```

ScriptRead

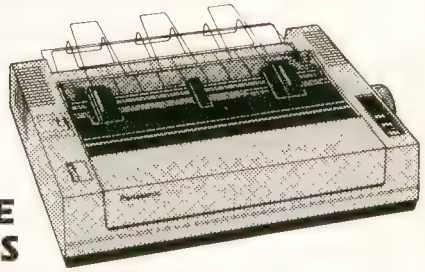
Article on page 77.

```
PC 10 PRINTCHR$(147)"LOADING..
      .":PRINT
QE 20 FORJ=49152TO49531:READA:
      POKEJ,A:X=X+A:NEXTJ
GC 30 IFX<>53244THENPRINT"ERRO
      R IN DATA...":END
HM 40 PRINT:PRINT"WHAT WOULD Y
      OU LIKE TO DO? (M=MENU)"
KS 50 POKE198,0
GP 60 GETA$:IFA$="B"THENSYS494
      91:GOTO60
GF 70 IFA$="D"THENN$="$":ML=49
      152:GOTO160
GA 80 IFA$="E"THENPRINT:OPEN15
      ,8,15:SYS49495:GOTO40
FK 90 IFA$="M"THEN210
KA 100 IFA$="R"THEN140
CE 110 IFA$="S"THEN170
HQ 120 IFA$="T"THENSYS49462:GO
       TO60
MR 130 GOTO60
FP 140 GOSUB200:INPUT"READ WHI
       CH FILE";N$:IFN$=""THEN
       40
BR 150 N$=N$+",P,R":ML=49206
KB 160 OPEN1,8,0,N$:SYSML:PRIN
       TCHR$(145):GOTO40
FP 170 GOSUB200:INPUT"SCRATCH
       {SPACE}WHICH FILE";N$:I
       FN$=""THEN40
HQ 180 OPEN15,8,15:PRINT#15,"S
       0:"+N$
BC 190 CLOSE15:GOTO40
KQ 200 N$="":PRINT:PRINT"PRESS
        RETURN ALONE TO CANCEL
       ...":PRINT:RETURN
AH 210 PRINT:PRINT"B=BACKGROUN
       D COLOR"SPC(7)"D=DIRECT
       ORY"
PS 220 PRINT"E=ERROR CHANNEL"S
       PC(10)"R=READ A FILE"
BP 230 PRINT"S=SCRATCH A FILE"
       SPC(9)"T=TEXT COLOR"
XE 240 PRINTTAB(9)"(RUN/STOP W
       ILL EXIT)":GOTO40
JA 250 DATA169,53,32,44,193,32
       ,207,255,32,207,255,32
JG 260 DATA207,255,32,207,255,
       32,207,255,72,32,207,25
       5
AD 270 DATA168,104,170,165,144
       ,240,3,76,153,192,152,3
       2
BJ 280 DATA205,189,169,32,32,2
       10,255,32,209,192,208,2
       48
XF 290 DATA32,204,192,76,11,19
       2,169,0,133,251,133,252
HC 300 DATA133,253,133,254,32,
       44,193,32,209,192,201,3
       1
DK 310 DATA176,9,24,105,64,32,
       237,192,76,149,192,201
GS 320 DATA31,208,33,166,252,2
       08,15,230,252,32,231,19
       2
RP 330 DATA169,110,160,193,32,
       30,171,76,149,192,165,1
       44
CC 340 DATA208,43,32,207,255,2
       01,32,240,245,76,70,192
DB 350 DATA201,32,240,12,201,9
       6,240,8,201,160,240,4
DX 360 DATA201,224,208,6,32,23
       1,192,76,149,192,201,12
       8
KB 370 DATA176,3,32,237,192,16
       5,144,240,170,169,1,32
SE 380 DATA195,255,32,204,255,
       165,2,208,29,165,251,24
       0
EQ 390 DATA3,32,231,192,32,204
       ,192,169,18,32,210,255
SR 400 DATA165,254,166,253,32,
       205,189,169,114,160,193
       ,32
MK 410 DATA30,171,169,0,133,19
       8,133,199,133,212,133,2
       16
GF 420 DATA169,13,76,210,255,1
       65,203,201,3,144,13,201
MJ 430 DATA7,144,246,201,62,20
       8,5,104,104,76,153,192
FP 440 DATA76,207,255,32,249,1
       92,76,6,193,166,251,157
EB 450 DATA121,193,230,251,162
       ,0,134,252,96,169,32,16
       6
DH 460 DATA211,240,249,224,39,
       144,203,76,204,192,165,
       251
SB 470 DATA240,238,24,101,211,
       201,39,144,3,32,204,192
CF 480 DATA162,0,230,253,208,2
       ,230,254,189,121,193,32
QP 490 DATA210,255,232,228,251
       ,144,245,169,0,133,251,
       96
JE 500 DATA133,2,32,68,229,162
       ,1,76,198,255,173,134
SE 510 DATA2,24,105,1,41,15,14
       1,134,2,162,0,157
MA 520 DATA0,216,157,0,217,157
       ,0,218,157,0,219,232
KQ 530 DATA208,241,96,238,33,2
       08,96,162,15,32,198,255
XA 540 DATA32,207,255,32,210,2
       55,201,13,208,246,169,1
       5
HQ 550 DATA32,195,255,76,204,2
       55,13,13,32,0,32,87
KH 560 DATA79,82,68,83,0,66,67
       ,0
```

Panasonic
Office Automation OA

PANASONIC 1080i PRINTER PACKAGE

SPECIAL PURCHASE



PACKAGE INCLUDES

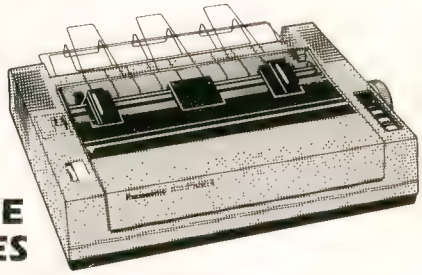
- PANASONIC KXP-1080i PRINTER
- XETEC SUPER GRAPHIC INTERFACE FOR C-64/128
- 1 EXTRA PANASONIC KXP-110 RIBBON

FREE SHIPPING IN CONTINENTAL USA
NO SURCHARGE ON CREDIT CARDS

$279

PANASONIC 1091i PRINTER PACKAGE

SPECIAL PURCHASE



PACKAGE INCLUDES

- PANASONIC KXP-1091i PRINTER
- XETEC SUPER GRAPHIC INTERFACE FOR C-64/128
- 1 EXTRA PANASONIC KXP-110 RIBBON

FREE SHIPPING IN CONTINENTAL USA
NO SURCHARGE ON CREDIT CARDS

$339

SPECIAL PURCHASE

PANASONIC 1092i PRINTER PACKAGE

PACKAGE INCLUDES

- PANASONIC KXP-1092i PRINTER
- XETEC SUPER GRAPHIC INTERFACE FOR C-64/128
- 1 EXTRA PANASONIC KXP-110 RIBBON

FREE SHIPPING IN CONTINENTAL USA
NO SURCHARGE ON CREDIT CARDS

$409

SINCE 1982

ComputAbility™

800-558-0003 IN WISCONSIN 414-357-8181
TELEX NUMBER 9102406440
(ANSWERBACK COMPUT MILW UQ)

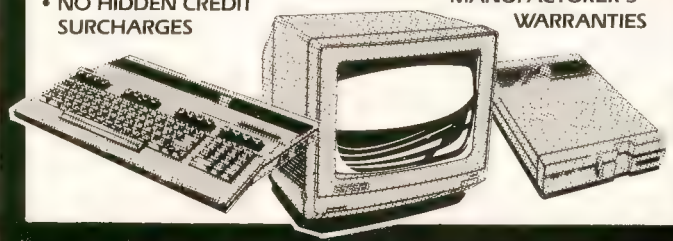
ORDERS OUTSIDE CONTINENTAL USA SEE ORDERING INFORMATION NEXT PAGE ►

COMMODORE 128

SUPER SALE FROM ComputAbility™

ORDER NOW — QUANTITIES LIMITED

- NO EXCESSIVE SHIPPING CHARGES
- NO HIDDEN CREDIT SURCHARGES
- ALL MERCHANDISE IS FACTORY NEW AND INCLUDES FULL MANUFACTURER'S WARRANTIES



SUPER C-128 PACKAGE #1

- COMMODORE 128 COMPUTER
- 1571 DISK DRIVE

FREE SHIPPING IN CONTINENTAL USA
NO SURCHARGES ON CREDIT CARDS
LIMITED TO FIRST 300 ORDERS

$489

SUPER C-128 PACKAGE #2

- COMMODORE 128 COMPUTER
- 1571 DISK DRIVE
- 1902 MONITOR

FREE SHIPPING IN CONTINENTAL USA
NO SURCHARGES ON CREDIT CARDS
LIMITED TO FIRST 100 ORDERS

$779

COMMODORE 128 COMPUTER

FREE SHIPPING IN CONTINENTAL USA
NO SURCHARGES ON CREDIT CARDS
LIMITED TO FIRST 100 ORDERS

$249

1571 DISK DRIVE

FREE SHIPPING IN CONTINENTAL USA
NO SURCHARGES ON CREDIT CARDS
LIMITED TO FIRST 100 ORDERS

$249

1902 RGB COMPOSITE MONITOR

FREE SHIPPING IN CONTINENTAL USA
NO SURCHARGES ON CREDIT CARDS
LIMITED TO FIRST 100 ORDERS

$289

SINCE 1982

COMMODORE 128 is a trademark of Commodore Electronics, Ltd

ComputAbility™

800-558-0003 IN WISCONSIN 414-357-8181
TELEX NUMBER 9102406440
(ANSWERBACK COMPUT MILW UQ)

ORDERS OUTSIDE CONTINENTAL USA SEE ORDERING INFORMATION NEXT PAGE ►

MOVING SALE SPECIAL #1
COMMODORE 128 COMPUTER
1571 DISK DRIVE
NO SURCHARGES ON CREDIT CARDS
FREE DELIVERY IN CONTINENTAL USA
$489
(LIMITED TO FIRST 300 ORDERS)

MOVING SALE SPECIAL #2
NX-10 PRINTER
XETEC SUPER GRAPHIC INTERFACE
2 EXTRA NX-10 RIBBONS
NO SURCHARGES ON CREDIT CARDS
FREE DELIVERY IN CONTINENTAL USA
$279

MOVING SALE SPECIAL #3
PANASONIC 1080i PRINTER
XETEC SUPER GRAPHIC INTERFACE
1 EXTRA RIBBON
NO SURCHARGES ON CREDIT CARDS
FREE DELIVERY IN CONTINENTAL USA
$279

MOVING SALE SPECIAL #4
PANASONIC 1091I PRINTER
XETEC SUPER GRAPHIC INTERFACE
1 EXTRA RIBBON
NO SURCHARGES ON CREDIT CARDS
FREE DELIVERY IN CONTINENTAL USA
$339

MOVING SALE SPECIAL #5
COMMODORE 128 COMPUTER
1571 DISK DRIVE
1902 RGB MONITOR
NO SURCHARGES ON CREDIT CARDS
FREE DELIVERY IN CONTINENTAL USA
$779
(LIMITED TO FIRST 100 ORDERS)

MOVING SALE SPECIAL #6
SEIKOSHA SP1000VC PRINTER
BUILT-IN GRAPHICS INTERFACE
NO SURCHARGES ON CREDIT CARDS
FREE DELIVERY IN CONTINENTAL USA
$179

MOVING SALE SPECIAL #7
COMMODORE 64C COMPUTER
1541C DISK DRIVE
1802C MONITOR
NO SURCHARGES ON CREDIT CARDS
FREE DELIVERY IN CONTINENTAL USA
PRICE TOO LOW TO ADVERTISE!

MOVING SALE SPECIAL #8
COMMODORE 1670 MODEM 129
COMMODORE 1351 MOUSE 44.95
1750 RAM EXPANDER 169
AVATEX 1200 HC MODEM . . 129
COMMODORE 64C/W GEOS CALL
1541C DISK DRIVE . . . . . CALL
XETEC SUPER GRAPHIC . . 69.95

COMPUTABILITY MOVING SALE
WE ARE MOVING TO LARGER AND EXPANDED OFFICE AND WAREHOUSE FACILITIES TO SERVE YOU BETTER AT LOWER PRICES

P R I N T E R E X T R A V A G A N Z A

PANASONIC
PANASONIC 1080i 199
PANASONIC 1091i 259
PANASONIC 1092i 349
PANASONIC 3131 279
PANASONIC 3151 409
PANASONIC 1592 419
PANASONIC 1595 539

OKIDATA
OKIDATA 120 215
OKIDATA 182 249
OKIDATA 192+ 369
OKIDATA 193+ 559
OKIDATA 292E 449
OKIDATA 293E 599
COMMODORE 64C w/GEOS . . . . . CALL

EPSON
LX 86 219
FX 86E 399
EX 800 479
EX 1000 629
FX 286E 569
LQ 800 519
LQ 1000 729
LQ 2500 1149

STAR MICRONICS
NX-10 . . . . . CALL
NX-10C . . . . . CALL
NL-10 . . . . . CALL
NP-10 169
NX-15 339
ND-15 449
NR-15 539
POWERTYPE 189
NB 24/15 (24 WIRE) . . CALL

MONITORS
MAGNAVOX 8562
RGB/COMP . . . . . CALL
COMMODORE 1802C 209
THOMSON 14"
RGB/COMP 279
COMMODORE 1902 . . 279

AMIGA COMPUTER SYSTEMS AND SOFTWARE PRODUCTS
CALL
FOR PRICE & AVAILABILITY

TIMEWORKS

TIMEWORKS C-64
SWIFTAX '86 . . . . . 32.95
WORDWRITER/SPELL . . . 32.95
SWIFTCALC/SIDEWAYS . . 25.95
DATA MANAGER II . . . 25.95
SYLVIA PORTER 32.95
EVELYN WOOD 25.95
SIDEWAYS 19.95
PARTNER 64 . . . . . 39.95

TIMEWORKS 128
WORDWRITER 128 . . . . 42.95
DATA MANAGER 128 . . 42.95
SYLVIA PORTER 128 . . 42.95
SWIFTCALC 128 . . . . . 42.95
PARTNER 128 . . . . . 42.95

C-128 SOFTWARE
Superbase 128 . . . . . 57.95
Paper Clip II 47.95
Wordwriter 128 . . . . 42.95
Data Manager 128 . . 42.95
Superscript 128 . . . . . 46.95
Perfect Writer 49.95
Sylvia Porter 128 . . . 42.95
Pocket Filer 2 . . . . . 36.95
Pocket Writer 2 . . . . . 36.95
Basic Compiler 128 . . 39.95
Fontmaster 128 . . . . 36.95
Multiplan 128 . . . . . 27.95
Chart Pak 128 . . . . . 25.95
Cad Pak 128 . . . . . 39.95
Super C Compiler . . . 39.95
Cobol 128 . . . . . 39.95
Speed Term 128 . . . . . 25.95
Pocket Planner 2 . . . 36.95
Mach V/128 . . . . . 32.95
Super Pascal 128 . . . . 39.95
Super Pak 128 . . . . . 46.95
Swiftcalc 128 . . . . . 42.95
Partner 128 . . . . . 42.95
Fleet System 4 . . . . . 46.95

LOWER PRICES — COMMODORE 64 SOFTWARE — LOWER PRICES

ABACUS 64
Chartpak 25.95
Cad-Pak 25.95
Powerplan 25.95
Super C Compiler . . . 39.95
Super Pascal 39.95
Basic Compiler 25.95
Forth 25.95
Geos Inside & Out . . . 16.95
Personal Portfolio . . . 25.95
Xper System 39.95

ACCESS
Mach V-Cart 21.95
Leader Board 24.95
Tournament Disk . . . 14.95
Tenth Frame 24.95
Executive Disk 14.95
Robotic Workshop . . . . Call
Triple Pak 14.95
Famous Courses 14.95

ACTIVISION
Gamemaker 25.95
2 on 2 Basketball . . . 22.95
Hacker II 22.95
Tass Times 22.95
Shanghai 22.95
Champ Baseball '86 . 22.95
Transformers 22.95
Gamemaker Library . 14.95
Labyrinth 22.95
Howard The Duck . . . 22.95
GFL Football 22.95
Greet. Card Maker . . 22.95
Aliens 22.95
Portal 25.95

BERKLEY SOFTWORKS
Geos 37.95
Geopublish 34.95
Geofile 34.95
Geocalc 34.95
Writer's Workshop . . 32.95
Geochart 27.95
Geodex 25.95
Deskpak I 22.95
Font Pak I 19.95

BRODERBUND
Bank St. Series(Ea) . . 32.95
Graphic Lib. 1,2 or 3 . 16.95
P. S. Companion 22.95
Toy Shop 39.95
Print Shop 28.95
Carmen Sandiego . . . 22.95
Thinking Cap 22.95
Type . . . . . CALL

EPYX
Destroyer 22.95
Fast Load 22.95
Movie Monster 22.95
Champ Wrestling . . . 22.95
World Games 22.95
Winter Games 22.95
Summer Games 14.95
Apshai Trilogy 14.95
Vorpal Utility 14.95
Multiplan 27.95
Super Cycle 22.95
St. Sports Basketball . 22.95
St. Sports Baseball . . 22.95
Summer Games 2 . . . 22.95
Sub Battle Simulat . . 22.95

MINDSCAPE
Perfect Score 44.95
Crossword Magic . . . 32.95
High Roller 19.95
Infiltrator 19.95
Bop 'N' Wrestle 19.95
Indoor Sports 19.95
American Challenge . 19.95
Defender of the Crown 22.95
S.D.I. 22.95
Fist 19.95
Uridium 19.95
Parallax 19.95
Uchi Mata (Judo) . . . 19.95
Trailblazer 19.95

BATTERIES INCLUDED
Home Pak 14.95
Consultant 34.95
Paperclip/Spell 27.95

ACCOLADE
Ace of Aces 18.95
Kill Until Dead 18.95
Hardball 18.95
Fight Night 18.95
PSI Trading Co. 18.95
Accolade Comics 24.95

MICROPROSE
Silent Service 22.95
Gunship 22.95
Accrojet 16.95
Top Gunner 16.95
F-15 Strike Eagle 22.95
Kennedy Approach . . 16.95
Crusade in Europe . . 25.95
Conflict in Vietnam . 25.95
Decision in the Desert 25.95

KONAMI
Rushin Attack/Kung Fu . . . 19.95
Hypersports/Ping Pong 19.95
Circus Charlie 19.95
Gradius 19.95
Jailbreak 19.95
Track & Field 19.95

SPRINGBOARD
Newsroom 30.95
Certificate Maker . . . 30.95
Graphics Expander . . 21.95
Clip Art 1 or 3 . . . . . 18.95
Clip Art 2 . . . . . 21.95
Cert. Maker Lib 1 . . . 21.95

SSI
Wizard's Crown 27.95
Broadsides 24.95
Field of Fire 24.95
Carrier Force 37.95
Computer Ambush . . 37.95
Kampfgruppe 37.95
Phantasie 24.95
Phantasie II 27.95
Mech Brigade 37.95
Rings of Zilfin 27.95
Battle Group 39.95
Shard of Spring 27.95
Roadwar 2000 . . . . . 27.95
Warship 39.95
Gemstone Healer . . . 20.95
War In S. Pacific 39.95
Wargame Construction 20.95

MISCELLANEOUS 64
Final Cartridge 39.95
Fellowship/Ring 23.95
Hobitt 23.95
Leather Goddesses . . 22.95
Moonmist 22.95
Hollywood Hijinks . . 22.95
Business Form Shop . 25.95
Fontmaster 2 . . . . . 30.95
Disney Comic Strip . . 23.95
Disney Card & Party . 23.95
Micro League Baseball . 25.95
WWF Wrestling 25.95
Starfleet I 26.95
Battle Front 26.95
Elite 22.95
Pocket Dictionary . . . 10.95
Thunder Chopper . . . 19.95
Up Periscope 19.95
Contriver Mouse 36.95
The Pawn 25.95
Tracker 25.95
Starglider 25.95
Jet 27.95
Sublogic Football . . . 27.95
Flight Simulatorll . . . 33.95
Sublogic Baseball . . . 33.95
Printmaster 21.95
Art Gallery 1 or 2 . . . 16.95
Superscript 64 . . . . . 32.95
Superbase 64 . . . . . 46.95
Animation Station . . 49.95

DATASOFT
Alternate Reality . . . 18.95
The Dungeon 18.95
Mercenary 18.95
Toburk-Clash 21.95
Swords & Sorcery . . . 18.95
Bismarck 21.95
Theatre Europe 21.95
Mercenary 18.95

DATA EAST
Karate Champ 16.95
Kung Fu Master 16.95
Commando 22.95
Tag Team Wrestling . . 22.95
Breakthrough 22.95

ELECTRONIC ARTS
Archon 10.95
Archon II 10.95
Financial Cookbook . 10.95
Heart of Africa 10.95
Mail Ord. Monsters . . 10.95
Mind Mirror 10.95
Movie Maker 10.95
Mule 10.95
Music Construction . 10.95
One On One 10.95
Pinball Construction . 10.95
Racing Destruction . . 10.95
Seven Cities of Gold . 10.95
Skyfox 10.95
Super Boulderdash . . 10.95
Touchdown Football . 10.95
Ultimate Wizard 10.95
Adv. Construction . . 25.95
America's Cup 22.95
Arctic Fox 22.95
Autoduel 31.95
Bard's Tale 25.95
Bard's Tale II 25.95
Chickamauga 23.95
Battlefront 25.95
Carriers At War 31.95
Europe Ablaze 31.95
Lords of Conquest . . 22.95
Marble Madness 20.95
Moebius 25.95
Murder Party 22 95
Ogre 25.95
Pegasus 23.95
Reach For The Stars . 30.95
Road To Moscow 25.95
Robot Rascals 25.95
Russia 25.95
Scrabble 22.95
Chessmaster 2000 . . 25.95
Ultima 1 . . . . . 25.95
Ultima 3 . . . . . 31.95
Ultima 4 . . . . . 38.95
World Tour Golf 23.95

INFOCOM
Call for items and prices

EST. 1982
ComputAbility™
P.O. Box 17882, Milwaukee, WI 53217
ORDER LINES OPEN
Mon.-Fri. 11 a.m. - 7 p.m. CST • Sat. 12 p.m. - 5 p.m. CST
To Order Call Toll Free
800-558-0003
For Technical Info, Order Inquiries, or for Wisc. Orders
414-357-8181
TELEX NUMBER 9102406440
(ANSERBACK = COMPUT MILW UQ)

No surcharge for Mastercard or Visa

ORDERING INFORMATION: Please **specify system.** For fast delivery send cashier's check or money order Personal and company checks allow 14 business days to clear School PO's welcome. **C.O.D. charges are $3.00.** In Continental U.S.A. include $3.00 for software orders. 4% shipping for hardware, minimum $4.00. MasterCard and Visa orders please include card # expiration date and signature. WI residents please include 5% sales tax. HI, AK, FPO, APO, Puerto Rico and Canadian orders, please add 5% shipping **minimum $5.00.** All other **foreign orders add 15% shipping, minimum $10.00.** All orders shipped outside the Continental U.S.A. are shipped first class insured U.S. mail. If foreign shipping charges exceed the minimum amount, you will be charged the additional amount to get your package to you quickly and safely. All goods are new and include factory warranty. Due to our low prices all sales are final. **All defective returns must have a return authorization number.** Please call (414) 357-8181 to obtain an R.A. # or your return will not be accepted. Prices and availability subject to change without notice.

FAST!

Triad Computers repair service does it fast! Most computers and disk drives are repaired and shipped within 72 hours!

Triad Computers knows how important getting your system back on line is. That's why we treat every repair as priority. From our computerized tracking to our factory trained technicians to our two-day return shipping, everything is geared towards getting your equipment back to you FAST!! Check our low prices!

	Repair	Repair with 1-Year Warranty	1-Year Service Contract
C-64 Computer	$ 59.00	$ 89.00	$ 69.00
C-128 Computer	89.00	119.00	99.00
1541 Drive Logic repair	69.00	99.00	79.00
1571 Drive Logic repair	79.00	109.00	89.00
1541 or 1571 Permanent Fix (Alignment and modification to stay in alignment!)	69.00	99.00	79.00
1702, 1802, 1902 Monitor	79.00	109.00	89.00
1541 or 1571 alignment (only)	Just 29.95		
MPS-801, 802, 1525, 1526 Printers	69.00	99.00	89.00
Star and Okidata Printers — Call			

When calling say "FIRST, FAST AND STILL THE BEST!" for a $10.00 discount on any Commodore 64 repair! (You must call for this discount.)

FREE PERMANENT FIX

A $69.00 value — includes alignment and modification to stay in alignment. FREE with any 1541 or 1571 one year warranty repair.

For fast, expert service . . . Just call our toll free number today!

1-800-624-6794

(For your convenience, have your equipment serial number and credit number ready. Checks and money orders also accepted). Add $7.50 for shipping — includes two-day air service anywhere in the Continental USA. For APO-FPO and P.O. Box addresses, add $15.00 for shipping (excluding air freight).

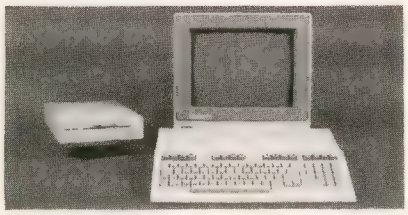
TRIAD COMPUTERS

3402-E W. Wendover Ave., Greensboro, NC 27407
1-800-624-6794 or (919) 299-0391

MasterCard VISA CHOICE

The Commodore Connection

COMMODORE COMPUTERS



COMMODORE 128 SYSTEM

Includes: CB128 Computer, CB1571 Disk Drive, CB1902 Monitor..... **$759.00**

COMMODORE 64 SYSTEM

Includes: CB64C Computer, CB1541C Disk Drive, CB1802C Monitor..... **$539.00**
CBM128 Mouse.....39.99
CBM128 512K Memory Expansion.....169.00
C64 Power Supply.....29.99
AMIGA 500.....Call for pricing
AMIGA 2000.....and configuration
Amiga 1 MB Board/0K.....249.00
Amiga Genlock Interface.....249.00

ACCESSORIES

CompGuard Surge & Spike Protector.....$14.99
Curtis SP2 Surge & Spike Protector.....39.99
Curtis Safe Strip with 6 Outlets.....19.99
Curtis Universal Printer Stand.....14.99
Computer Specialties Power Plus.....54.99
CB128 Universal Monitor Cable.....16.99

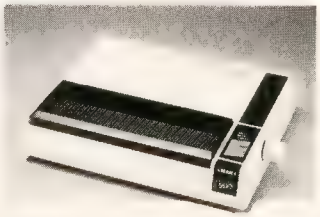
MONITORS

COMMODORE
Commodore 1802C.....$199.00
Commodore 1902.....299.00
MAGNAVOX
515 RGB/Composite.....289.00
8502 Composite.....189.00
8505 RGB/Composite.....199.00
ZENITH
ZVM 1220/1230.....(ea.) 99.99
AMIGA
1080 Hi-Res Color.....269.00

MODEMS

ANCHOR
Volksmodem 300/1200.....139.00
6480 -64/128 300-1200 Baud.....119.00
Omiga 80 -Amiga 300-1200 Baud.....129.00
HAYES
Smartmodem 300.....139.00
Smartmodem 1200.....389.00
COMMODORE
Amiga 1680-1200 BPS.....169.00
CBM 1660 (C-64).....59.99
CBM 1670 (C-128).....99.99
PRACTICAL PERIPHERALS
1200 BPS External.....159.00

PRINTERS



JUKI 5510C PRINTER $349

EPSON
LX-86, 120 cps.....$199.00
FX-85, FX-286.....Call
EX-800, EX-1000.....Call
HI80 4 Pen Plotter.....359.00
Free book w/purchase
HEWLETT PACKARD
Think Jet.....399.00
JUKI
6000 12 cps Daisywheel.....189.00
6100 18 cps Daisywheel.....369.00
6300 40 cps Daisywheel.....649.00
OKIDATA
Okimate 20 Color Printer.....139.00
ML-182 120 cps Dot Matrix.....239.00
ML-192 160 cps Dot Matrix.....369.00
STAR MICRONICS
NL-10 w/interface.....Call
NX-10 120 cps Dot Matrix.....229.00
TOSHIBA
P321 24 Wire 80 column.....479.00
P341 24 Wire 136 column.....589.00

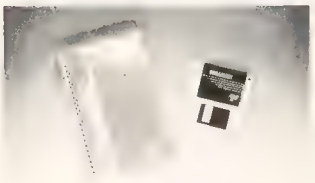
DRIVES

COMMODORE
Amiga 1010 3½".....219.00
Amiga 1020 5¼".....189.00
1541C.....179.00
1571.....239.00
CSI
10 mb (64-128).....1099.00
MICROBOTICS
20 mb Hard Drive (Amiga).....1299.00
XEBEC
20 mb (Amiga).....899.00

DISKETTES

MAXELL
MD1-M SS/DD 5¼".....8.99
MD2-DM DS/DD 5¼".....10.99
MD2-HDM 5¼" Hi Density.....21.99
MF1-DDM 3½" SS/DD.....12.99
MF2-DDM 3½" DS/DD.....21.99
SONY
MD1D SS/DD 5¼".....7.99
MD2D DS/DD 5¼".....9.49
MD2HD 5¼" Hi Density.....20.49
MFD-IDD 3½" SS/DD.....12.99
MFD-2DD 3½" DS/DD.....19.99
FLIP 'N FILE
Micro (25) 3½" (50) 5¼".....9.99
Mini XT 100 5¼" holder.....19.99

AMIGA SOFTWARE



Micro Systems ORGANIZE $64.99

ACTIVISION
Borrowed Time.....32.99
Hacker.....32.99
COMMODORE
Textcraft w/Graphic Craft.....59.99
Lattice "C".....119.00
Assembler.....79.99
Enhancer DOS 1.2.....14.99
DISCOVERY SOFTWARE
Marauder Back-up.....32.99
ELECTRONIC ARTS
Deluxe Paint.....69.99
Sky Fox.....31.99
Seven Cities of Gold.....31.99
Arctic Fox.....31.99
Deluxe Print.....74.99
Instant Music.....34.99
Deluxe Video.....69.99
INFOCOM
Hitchhiker's Guide.....31.99
MICRO ILLUSIONS
Dynamic-Cad.....349.00
MINDSCAPE
Halley Project.....31.99
Deja Vu.....34.99
MICRO SYSTEMS
Analyze Version 2.0.....119.00
Scribble.....64.99
On-Line/Comm.....49.99
SUBLOGIC
Flight Simulator II
V.I.P.
V.I.P. Professional.....139.00

C64/128 SOFTWARE

COMMODORE
Jan-integrated (128).....39.99
Geos for 64, 64C, 128.....49.99
BRODERBUND
The Print Shop.....29.99
Graphics Library 1,2,3.....(ea.) 17.99
The Toy Shop.....39.99
Print Shop Companion.....24.99
PROFESSIONAL SOFTWARE
Fleet Systems II C128/64.....49.99
Fleet Systems III C128.....49.99
Trivia Fever.....19.99
PFS
File.....29.99
SUBLOGIC
Flight Simulator.....37.99
Jet Simulator C64.....37.99

COMPUTER MAIL ORDER

In the U.S.A. and Canada

Call toll-free 1-800-233-8950

Outside the U.S.A. 717-327-9575 Telex 5106017898
Corporate and Educational Institutions call toll-free: 1-800-221-4283
CMO. 477 East Third Street, Dept. A405, Williamsport, PA 17701
All major credit cards accepted.

POLICY: Add 3%, minimum $7.00 shipping and handling. Larger shipments may require additional charges. Personal & company checks require 3 weeks clearance. For faster delivery use your credit card or send cashier's check or bank money order. PA residents add 6% sales tax. Defective software will be replaced with same item only. All items subject to availability and price change. All sales final, returned shipments are subject to restocking fee.

COMB

Authorized Liquidator

COMMODORE® VICMODEM™

- **Use with the Commodore® C64™, the SX-64 or the VIC-20 Computer.**
- **Bell 103 Compatible.**
- **Full Duplex; 300 Baud.**
- **Manual Dial Direct Connecting.**
- **FCC Registered.**

This Modem is **LOW liquidation priced** because it was closed out by Commodore®. Add it to your computer for access to timely financial information, news and reference libraries...as near as your phone! An affordable introduction to phone/computer services; and you can communicate with computer users who also own modems!

Use with data cassette (included), or with terminal program software, available at computer stores.

90-Day Limited Factory Warranty.

List: $59.00

Liquidation Priced At Only $19

Item H-2409-7041-072 Ship, hand: $4.00 ea.

Commodore is a registered trademark of Commodore Electronics, Ltd.

VISA MasterCard DISCOVER AMERICAN EXPRESS

Credit card members can order by phone, 24 hours a day, 7 days a week.

Toll-Free: 1-800-328-0609

Sales outside the 48 contiguous states are subject to special conditions. Please call or write to inquire.

SEND TO: **Item H-2409**
C.O.M.B. Direct Marketing Corp.
1405 Xenium Lane N/Minneapolis, MN 55441-4494

Send ___ **Modem(s)** Item H-2409-7041-072 at $19 each, plus $4 each for ship, handling. (Minnesota residents add 6% sales tax. Sorry, no C.O.D. orders.)

☐ My check or money order is enclosed. (No delays in processing orders paid by check.)

PLEASE CHECK: ☐ VISA ☐ MasterCard ☐ DISCOVER ☐ AMERICAN EXPRESS

Acct. No. _____ Exp. ___/___

PLEASE PRINT CLEARLY

Name _____

Address _____

City _____

State _____ ZIP _____

Phone (_____) _____

Sign Here _____

COMBCOMBCOMB

Introducing

MAXI MATH I, II, & III

A COMPREHENSIVE ELEMENTARY SCHOOL MATH TEACHING SYSTEM IN THREE PROGRAMS ON ONE DISK

For Use On
COMMODORE 64/128 COMPUTERS

INFINITE NUMBER OF PROBLEMS
FOR KINDERGARTEN THROUGH 6TH GRADE

MAXI MATH is offered as an excellent training aid for parents and teachers in their efforts to prepare children for higher level mathematics.

Programs include:

2 beginner kindergarten counting programs
Reading small numbers
Reading large numbers
Reading decimals
14 levels of addition including decimals
5 levels of subtraction
12 levels of multiplication going through 3 digits times 3 digits decimal multiplication
10 levels of division going through decimal long division
10 types of common fractions plus decimal fractions
8 printer lessons that include 16 types and levels of math
5 percentage lessons including:
Program to compute terms on loans and credit accounts
Program to calculate investment return options

Instructions for working problems are part of computer programs. When an incorrect answer is given, **MAXI MATH** will show how to work out the complete problem.

MAXI MATH is also a very effective review method for high school students and adults who for some reason need to "brush up" on basic mathematics.

MAXI MATH I, II, III system **$29.95**
plus $3.00 shipping

Commodore 64/128 is a registered trademark of Commodore Business Machines, Inc

MAXI MATH

6317 S. Chenot Dr.
Amarillo, TX 79109-6511 Phone (806)354-0012

Check or money order. Checks allow 3 weeks to clear.

Software Discounters of America

S.D. of A.

For Orders Only—1-800-225-7638
PA Orders—1-800-223-7784
Customer Service 412-361-5291

- Free shipping on orders over $100 in continental USA
- No surcharge for VISA/MasterCard
- Your card is not charged until we ship

ABACUS SOFTWARE
Assembler Monitor (D) $25
Basic (D) $25
Basic 128 $39
Cad Pak (D) $25
Cad Pak 128 $39
Chart Pak 128 $25
Cobol (D) $25
Cobol 128 $39
Forth (D) $25
Power Plan (D) $25
PPM (D) $25
PPM 128 $39
Speed Term 64 or 128 $25
Super C (D) $39
Super C 128 $39
Super Pascal (D) $39
Super Pascal 128 $39

ACCESS
Executive Leader Board Tourn. Disk $14
L.B. Famous Course Disk $14
Leader Board Golf (D) $25
Leader Board Tourn. Disk #1 $14
Robotics Workshop 119
Tenth Frame (D) $25
Triple Pack: BH1, BH2, Raid Over Moscow (D) $14
World Class Leader Board Call

ACCOLADE
Ace of Aces (D) $19
Comics (D) $25
Fight Night (D) $19
4th & Inches Football (D) $19
Hardball (D) $19
Killed Until Dead (D) $19
PSI-5 Trading (D) $19

ACTION SOFT
Thunder Chopper (D) $19
Up Periscope! (D) $19

ACTIVISION
Aliens (D) $23
Cross Country Road Race (D) $19
Gamemaker (D) $25
Gamemaker Library Disks
Sports $14
Science Fiction $14
Greeting Card Maker (D) $23
Hacker 2 (D) $23
Little Computer People (D) $23
Music Studio (D) $23
Portal (D) $25
Shanghai (D) $23
Tass Times (D) $23
Transformers (D) $23

ARTWORX
Beach Blanket Volleyball (D) $9.88
Bridge 4.0 (D) $16
Equestrian Show Jumper (D) $9.88
Highland Games (D) $9.88
Hole In One + 6 (D) $9.88
International Hockey (D) $16
Police Cadet (D) $9.88
Strip Poker (D) $21
Data Disk #1 Female $14
Data Disk #2 Male $14
Data Disk #3 Female $14
Thai Boxing (D) $9.88

AVALON HILL
Dr. Ruth (D) $19
Super Sunday (D) $21
SBS 1985 Team Disk $14
SBS Champs Disk $14
Spitfire '40 (D) $23
Title Bout (D) $19

AVANTAGE
Desert Fox (D) $9.88
Deceptor (D) $9.88
Power (D) $9.88
Spy vs. Spy 1 & 2 (D) $9.88

BATTERIES INCLUDED
Consultant (64 or 128) $36
Paperclip w/Spell (D) $29
Paperclip II 128 $49

BERKELEY SOFTWORKS
Geos 128 $44
Geos 64 (D) $39
*Geo-Calc (D) $33
*Geos Desk Pak 1 (D) $23
*Geos Desk Pak 2 (D) Call
*Geo-Dex (D) $25
*Geo-File (D) $33
*Geos Font Pak (D) $19
*Writer's Workshop (D) $33
*Geos 64 add-on programs only!

BRODERBUND
Bank St. Series Call
Carmen Sandiego: USA (D) $25
Carmen Sandiego: World (D) $23
Karateka (D) $19
Print Shop (D) $26
P.S. Companion (D) $23
P.S. Graphics Library #1, #2, or #3 $16 Ea.
P.S. Graphics Library Holiday Edition $16
Toy Shop (D) $39

CMS
CMS Accounting (D) $119
CMS Acct. 128 $119
CMS Inventory 128 $49

DATA EAST
Breakthru (D) $23
Commando (D) $23
Express Raider (D) $23
Ikari Warriors (D) $23
Karate Champ (D) $14
Kung Fu Master (D) $14
Tag Team Wrestling $23

DAVIDSON
Algeblaster (D) $33
Math Blaster (D) $33
Speed Reader II (D) $33
Spell It (D) $33
Word Attack (D) $33

ELECTRIC DREAMS
Rocky Horror Show (D) $14
Spindizzy (D) $9.88
Titanic Recovery Mission (D) $14
Zoids (D) $9.88

ELECTRONIC ARTS
Software Classic Series:
Archon (D) $9.88
Archon 2: Adept (D) $9.88
Financial Cookbook (D) $9.88
Heart of Africa (D) $9.88
Mail Order Monsters (D) $9.88
Mind Mirror (D) $9.88
Movie Maker (D) $9.88
M.U.L.E. (D) $9.88
Music Const. Set (D) $9.88
One-on-One (D) $9.88
Pinball Const. Set (D) $9.88
Racing Dest. Set (D) $9.88
Seven Cities Gold (D) $9.88
Skyfox (D) $9.88
Super Boulder Dash (D) $9.88
Touchdown Football (D) $9.88
Ultimate Wizard (D) $9.88

ELECTRONIC ARTS
Adv. Const. Set (D) $26
America's Cup Sailing (D) $23
Arctic Fox (D) $23
Bard's Tale 1 (D) $26
Bard's Tale 2: The Destiny Knight (D) $26
Battlefront (D) $26
Chessmaster 2000 (D) $26
Lords of Conquest (D) $23
Make Your Own Murder Party (D) $23
Marble Madness (D) $23
Pegasus (D) $25
Road to Moscow (D) $26
Robot Pascals (D) $26
Russia—The Great War (D) $26
Scrabble (D) $23
Star Fleet I (D) $26
World Tour Golf (D) $25

EPYX
Ballblazer (D) $9.88
Barbie (D) $9.88
Champ. Wrestling (D) $23
Create A Calendar (D) $19
Destroyer (D) $23
Fast Load (R) $23
Impossible Mission (D) $9
Koronis Rift (D) $9.88
Multiplan 128 $25
P.S. Graphics Scrapbook #1: Sports (D) $16
#2: Off the Wall (D) $16
#3: School (D) $16
Rescue on Fractalus (D) $9.88
Street Sports: Baseball (D) Call
Street Sports: Basketball (D) Call
Sub Battle (D) $25
Summer Games 2 (D) $23
Super Cycle (D) $23
The Eidolon (D) $9.88
World Karate (D) $17.95
World Games (D) $23

FIREBIRD
Elite (D) $19
Golden Path (D) Call
Guild of Thieves (D) Call
Starglider (D) $25
Talking Teacher (D) $25
The Pawn (D) $25
Tracker (D) $25

GAMESTAR
Champ. Baseball (D) $23
Champ. Basketball (D) $23
Star Rank Boxing (D) $19
GFL Championship Football (D) $23
On-Court Tennis (D) $19

HES
Microsoft Multiplan (D) $14
Project Space Station (D) $19

HI-TECH EXPRESSIONS
Award Ware (D) $9.88
Card Ware (D) $6.88
Heart Ware (D) $6.88
Party Ware (D) $9.88

INFOCOM
Ballyhoo (D) $25
Hitchhiker's Guide to the Galaxy (D) $23
Hollywood Hijinx (D) $25
Leather Goddesses $23
Moonmist (D) $23
Trinity 128 $25
Wishbringer (D) $23
Zork 1 (D) $23

KONAMI
Jailbreak (D) $19
Yie Ar Kung Fu/ Rush 'N Attack (D) $19
Yie Ar Kung Fu 2 (D) $19

MASTERTRONIC
Action Biker (D) $6.88
Bounder (D) $6.88
Captain Zap (D) $6.88
Electra Glide (D) $6.88
Infinity Machine (R) $9.88
5-A-Side Soccer (D) $6.88
Knight Games (D) $6.88
Last V-8 (D) $6.88
Magnum Joystick $12
Master of Magic (D) $6.88
Ninja (D) $6.88
Pro Golf (D) $6.88
Shogun (D) $6.88
Speed King (D) $6.88
The Slugger (D) $6.88
Vegas Poker & Jackpot (D) $6.88

MICROLEAGUE
Baseball (D) $25
Box Score Stats (D) $16
General Manager (D) $25
1985 Team Data Disk $14
1986 Team Data Disk $14
WWF Wrestling (D) $25

MICROPROSE
Acrojet (D) $16
Conflict in Viet Nam (D) $25
Crusade in Europe (D) $25
Decision in Desert (D) $25
F-15 Strike Eagle (D) $23
Gunship (D) $23
Kennedy Approach (D) $16
Silent Service (D) $23
Top Gunner (D) $16

MINDSCAPE
Bank St. Music Writer (D) $9.88
Bop & Wrestle (D) $19
Crossword Magic (D) $33
Fairlight (D) $19
Fist (D) $19
High Roller (D) $19
Indoor Sports (D) $19
Infiltrator (D) $19
Parallax (D) $19
Perfect Score SAT (D) $44
The American Challenge Sailing Simulation (D) $19
Trail Blazer (D) $19
Uchi Mata (D) $19
Uridium (D) $19

MISC
Celebrity Cookbook (D) $19
CSM 1541 Align Kit (D) $29
Central Point—Copy 2 (D) $23
Font Master 2 (D) $33
Font Master 128 $39
Gato (D) $16
GEOS—Inside & Out (Book) $15
Snapshot 64 (R) $39
Superbase 64 (D) $47
Superbase 128 (D) $59
Superscript 64 (D) $33
Superscript 128 $47

ORIGIN
Autoduel (D) $32
Moebius (D) $26
Ogre (D) $26
Ultima 3 (D) $32
Ultima 4 (D) $39

PROFESSIONAL
Fleet Filer (D) $25
Fleet System 2 (D) $39
Fleet System 3 128 $43
Fleet System 4 128 $49

RELEVANT
Billboard Maker (D) $25
Icon Factory (D) $25
Photo Finish (D) $19

SCARBOROUGH
Build A Book (D) $16
Mastertype (D) $25

SIMON & SCHUSTER
Chem. Lab (D) $25
Great Int'l. Paper Airplane Const. (D) $19
Star Trek: Promethean Prophecy (D) $19
Typing Tutor 3 (D) $25

SPRINGBOARD
Certificate Maker (D) $33
C.M. Library Vol. 1 $23
Newsroom (D) $33
N.R. Clip Art Vol. 1 (D) $19
N.R. Clip Art Vol. 2 (D) $25
N.R. Clip Art Vol. 3 (D) $19
Print Shop Graphics Expander (D) $23

SSI
Battle Cruiser (D) $37
Battle Group (D) $37
Battle of Antietam (D) $33
Colonial Conquest (D) $25
Gettysburg (D) $37
Kampfgruppe (D) $37
Mech Brigade (D) $37
NAM (D) $25
Phantasie (D) $25
Phantasie 2 (D) $25
Rings of Zilfin (D) $25
Roadwar 2000 (D) $25
Shard of Spring (D) $25
War Game Construction Set (D) $19
War in the South Pacific (D) $37
Warship (D) $37
Wizard's Crown (D) $25

SOFTSYNC
Personal Accountant (D) $23

SUBLOGIC
Baseball (D) $32
Flight Simulator 2 (D) $32
F.S. Scenery Disks Call
Football (D) $26
Jet (D) $26

TELARIUM
Amazon (D) $9.88
Dragon World (D) $9.88
Fahrenheit 451 (D) $9.88
Perry Mason (D) $9.88
Rendezvous (D) $9.88

THUNDER MOUNTAIN
Cyrus Chess (D) $6.88
Maxi Golf (D) $6.88
Mr. Pixel's Cartoon Kit (D) $6.88
Rambo: First Blood Part II (D) $6.88
The Eliminator (D) $6.88
Top Gun (D) $6.88

TIMEWORKS
Accts. Payable (D) $33
Accts. Receivable (D) $33
Data Manager 2 (D) $25
Data Manager 128 $43
General Ledger (D) $33
Inventory Mgmt (D) $33
Partner 64 (R) $39
Partner 128 (R) $43
Swiftcalc/Sideways (D) $25
Swiftcalc/ Sideways 128 $43
Swiftax '86 $33
Sylvia Porter's Personal Fin. Planner (D) 64 $33
Sylvia Porter's Personal Fin. Planner 128 $43
Word Writer 3 (D) $33
Word Writer 128 $43

UNISON WORLD
Art Gallery 1 (D) $16
Art Gallery 2 (D) $16
Print Master Plus (D) $23

VALUE TIME
Art Library 1 or 2 (D) $6.88
Calendars & Stationery (D) $6.88
Greeting Cards (D) $6.88
Signs & Banners (D) $6.88

WEEKLY READER
Stickybear Series: ABC's (D) $16
Stickybear Series: Math (D) $16
Stickybear Series: Numbers (D) $16
Stickybear Series: Opposites (D) $16
Stickybear Series: Reading (D) $16
Stickybear Series: Shapes (D) $16
Stickybear Series: Spellgrabber (D) $16

WINDHAM CLASSICS
Alice in Wonderland (D) $6.88
Below the Root (D) $6.88
Swiss Family Robinson (D) $6.88
Treasure Island (D) $6.88
Wizard of Oz (D) $6.88

ACCESSORIES
Bonus SS, DD $5.99 Bx
Bonus DS, DD $6.99 Bx
Compuserve Starter Kit (a $25 usage Credit) $19
Disk Case (Holds 75) $9
Disk Drive Cleaner $9
Epyx 500XJ Joystick $14
Wico Bat Handle $17
Wico Boss $12

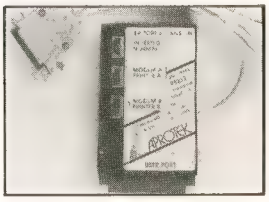
P.O. BOX 111327—DEPT. CG—BLAWNOX, PA 15238

*Please Read The Following Ordering Terms & Conditions Carefully Before Placing Your Order: Orders with cashiers check or money order shipped immediately on in stock items. Personal & Company checks, allow 3 weeks clearance. No C.O.D.'s! *Shipping: Continental U.S.A.*—Orders under $100 add $3; *free shipping on orders over $100. AK, HI, FPO, APO—add $5 on all orders. Canada & Puerto Rico—add $10 on all orders.* Sorry, no other International orders accepted! *PA residents add 6% sales tax on the total amount of order including shipping charges! REASONS FOR CALLING CUSTOMER SERVICE—412-361-5291 (1)* Status of order or back order *(2)* If any merchandise purchased within 60 days from S.D. of A. is defective, please call for a return authorization number. Defective merchandise will be replaced with the same merchandise only. Other returns subject to a 15% restocking charge. After 60 days please refer to the manufacturers warranty included with the merchandise & return directly to the manufacturer. *Customer service will not accept collect calls or calls on S.D. OF A.'s 800# order lines!* Have you seen our on line catalog of 1000 software titles for Commodore, Atari, Apple, IBM and Amiga? It's on Compuserve's Electronic Mall—just type GO SDA and shopping for software will never be the same again! *HOURS: Mon.-Fri. 9AM-5:30 PM, Sat. 10AM-4PM Eastern Time. Because this ad had to be written 2-3 mos. before it was published, prices & availability are subject to change!*

UNIVERSAL RS-232 INTERFACE

with Commodore User Port expansion.ONLY $39.95 + shipping

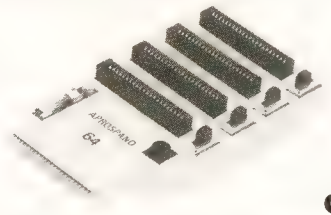
Now you can connect and communicate with any of the popular RS-232 peripherals using your Commodore User Port. You can even connect more than one and leave it permanently attached. This superb expander opens a whole new world to your Commodore computer's capabilities. You can now connect to printers, modems and any other RS-232 devices. If you already have a device that connects to the User Port, don't worry because the port is duplicated on the outside edge of the interface. Simply plug it in and turn on the device you want to communicate with. Comes complete with sample driver program listings. Compatible with all Commodore home computers with a user port. 1-year warranty. **Order #5232.**



Aprospand-64™

Gives your Commodore 64 or 128 full expandability!This superbly designed expansion module plugs into the expansion port & gives you 4 switchable (singly or in any combination) expansion connectors —plus fuse protection—plus a reset button! Before you buy an expander, be sure that it has a fuse to protect your computer and that you can activate your cartridges in **any** combination allowed by the cartridges.

The Original



Fully C-128 Compatible

Order # 5064

NOW ONLY $29.95 + shipping

NEW! ***"EXTENDER-64"*** allows you to place your Aprospand-64 (or any other cartridge expander) in a more convenient location. This device is a 10" section of ribbon cable with male and female connectors that allows you to place your cartridges to the side of, rather than in back of, your computer. This puts your cartridges and switches within easy reach.

ONLY $19.95 + shipping. **Order #5065**

Commodore Interfaces and Cables

Cardprint G-WIZ Printer Interface #1108	$46.95
Commodore Serial Extension Cables	$Call
Amiga Printer Cable (6 ft) #3040-6MF	$17.95
Amiga Printer Cable (10 ft) #3040-10MF	$21.95
Commodore 6 Pin Serial Cable (5 ft) #3006-5MM	$ 6.95
Commodore 6 Pin Serial Cable (8 ft) #3006-8MM	$ 8.95

Shipping per above items: $3. Cont. US $6. CAN,PR,HI,AK,APO,UPS Blue

PRINTERS

	Price & Shipping
Aprotek Daisy 1120, 20 CPS, Order #1120	$279.95 + $11.00
Auto Cut-Sheet Feeder, Order #1110	$185.00 + $7.00
Tractor Feed, Order #1112	$ 75.00 + $5.00

SEIKOSHA

SP-1000VC (C-64) Order#2200	$163.95 + $10.00
SP-1000 Apple IIc, Mac Order #2300	$184.95 + $10.00
SP-1000 IBM Order #2100	$184.95 + $10.00
SP-1000 Serial Order #2500	$184.95 + $10.00
SP-1200AI Order #2600	$199.95 + $10.00
MP-1300AI 300 CPS, #2700	$449.95 + $12.00
MP-1300 Color Kit Order #2705	$119.95 + $ 5.00
BP-5420 420 CPS Order #2800	$949.95 + $27.00

ORDER INFORMATION California residents add 6% tax. All prices are cash prices—VISA and MC add 3% to total. We ship the next business day on money orders, cashier's checks, and charge cards. A 14-day clearing period is required for checks. Prices subject to change— CALL. Dealer inquiries invited.

For information and in Calif. call **805/987-2454**

TO ORDER CALL TOLL FREE

1 (800) 962-5800 (7-7 PST)

Or send order to:

Dept CG

APROTEK

1071-A Avenida Acaso
Camarillo, CA 93010

ADVANCED DETECTION & CONTROL

NO INTERFACE IS EASIER TO USE

- Control lights, appliances, heating and cooling systems, relays, motors and virtually any electrical device.
- Connect to temperature, light, sound, moisture, fluid level and pressure sensors.
- 32 separate buffered digital output lines.
- 32 separate digital input lines.

BH100 I/O Card User Manual, instructions, sample programs & diagrams of typical hookups. **$129**

8 Channel A/D Plug-in Conversion Module $45 Fast 8 bit 0-5V A/D converter.

Complete I/O Course Includes BH100, Beginner's Module, Course Manual and User Manual. **$159**

Security System Module With siren, switches and software. **$35**

Beginner's I/O Interface Course Manual $15 Manual used in above Course.

Beginner's Module $25 With 8 LEDs, 8 switches and 1 relay. Requires the BH100.

INTELLIGENT I/O

P.O. BOX 70 • POTSDAM, NY 13676

VISA* (315) 265-6350 MasterCard

Call for free brochure today!

We ship within 48 hours
Add $4 for postage and specify C-64 or VIC-20.

Use your **Commodore 64/128** to improve your performance at the track! Programs for **Thoroughbred, Harness** and **Greyhound** racing rank the horses or dogs in each race quickly and easily. All the information is readily available from the *Racing Form*, harness or dog track program.

Thoroughbred factors include speed, distance, past performance, weight, class, jockey's record, beaten favorite and post position. **Harness factors** include speed, post position, driver's record, breaking tendencies, class, parked-out signs and beaten favorite. **Greyhound factors** include speed, past performance, maneuvering ability, favorite box, class, kennel record, beaten favorite and breaking ability.

Complete instructions and wagering guide included. **Thoroughbred, Harness** or **Greyhound Handicappers**, $39.95 each on tape or disk. Any two for $59.95 or all three for $79.95.

MasterCard **Federal Hill Software** VISA®
8134 Scotts Level Rd.
Baltimore, MD 21208

Toll Free Orders 800-628-2828 Ext. 850
For Information 301-521-4886

MONTGOMERY GRANT

115 Nassau St. Between Beekman & Ann Sts. N.Y., N.Y. 10038 (212) 732-4500 Penn Station/Amtrack Level Beneath Madison Sq. Garden, N.Y., N.Y. 10001
open Mon-Fri: 8:30am - 6:30pm Sat: 9:30am - 6pm Sun: 9:30am - 5:30pm (212) 594-7140 open Mon-Fri: 8:30am - 8pm Sat. & Sun: 9:30am - 7pm

PHONE and MAIL ORDERS ONLY (212) 732-4500
Call Collect

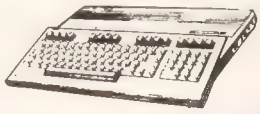
AMERICAN EXPRESS · VISA · MasterCard · DISCOVER

ALL COMPUTERS & PERIPHERALS COME COMPLETE WITH AC ADAPTOR, OWNER'S MANUAL AND ALL CONNECTING CABLES.

ALL MERCHANDISE IS BRAND NEW AND FACTORY FRESH, COMPLETE WITH MFR. U.S.A. WARRANTY.

commodore 128

128 K RAM Powered Personal Computer



$239.95

commodore 64C

64 K RAM Powered Home Computer

$159.95 *With Geos Program!*

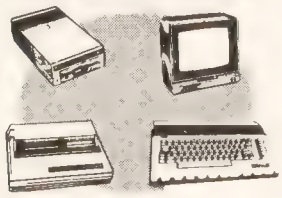
NEW 1541C NEW Disk Drive **$169.95**

1541 Disk Drive **$149.95**

1571 Disk Drive **$219.95**

commodore COMPUTER PACKAGES
Get it all together & save!

64C COLOR PACKAGE

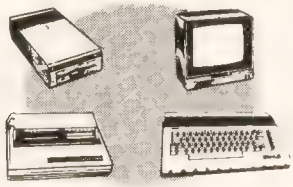


- Commodore 64C Computer
- Commodore 1541 Disk Drive
- Commodore Color Printer
- Color Monitor

With Geos Program!

$549.95

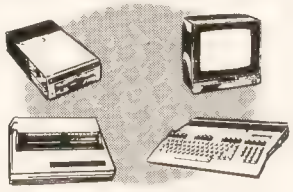
64C COMPLETE PACKAGE



- Commodore 64C Computer
- Commodore 1541 Disk Drive
- Commodore Color Printer
- 12" Computer Monitor

$399.95

128 COMPLETE PACKAGE



- Commodore 128 Computer
- Commodore 1541 Disk Drive
- 12" Computer Monitor
- Commodore Color Printer

TO SUBSTITUTE 1571 for 1541 ADD $70

$499.95

128 DELUXE PACKAGE

- Commodore 128 Computer
- Commodore 1571 Disk Drive
- Commodore 1902 Color Monitor
- Commodore 80 Column Printer

GEOS Program $39.95

$759.95

PERIPHERALS

1660 Phone Modem **$39.95**

1670 Automodem.....$119.95

1350 "Mouse" for any Commodore Computer **$39.95**

1700 128 K Expansion Module.....$89

1750 512 K Expansion Module. $169

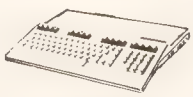
"MAGIC VOICE" Module ... $49.95

1802 Color Computer Monitor **$189.95**

1902 RGB Color Monitor **$249.95**

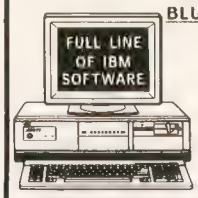
ATARI 1040 COLOR SYSTEM

•1040 Keyboard w/Built-in Disk Drive •Atari Color Monitor •AC Adaptors •All Hook-up Cables •10 Diskettes & Box •Game Cartridge •Owners Manual



$899.95

BLUE CHIP IBM® PC COMPATIBLE



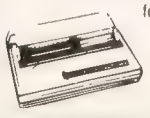
- 512K Ram Expandable to 640K
- 6 Expansion Slots
- Optional 20MB Hard Drive
- Blue Chip Keyboard
- Disk Drive
- 12" Computer Monitor

$749.95

COMPUTER PRINTERS

commodore MPS-803C PRINTER

NEW Commodore TU-803 Tractor for Printer.....$34.95 **$139.95**



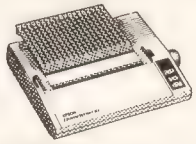
commodore MPS-1200 PRINTER **$239.95**

COMPUTER PRINTERS

star NP-10 HIGH SPEED PRINTER **$189.95**

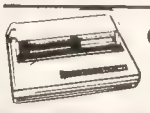
STAR POWER TYPE Daisy Wheel Letter Quality **$199.95**

STAR NX-10 Printer.....$199



EPSON HOMEWRITER 10 **$169.95**

OKIDATA 120 PRINTER **$199.95**



OKIMATE 20 with Plug 'n' Print **$189.95**

Certified check, bank check, MasterCard, Visa, Am-Ex, Diner's Club, Carte-Blanche, abd Discover Card accepted. Non-certified checks must wait 4-6 weeks for bank clearance. Money orders are non-certified checks. N.Y. residents add 8 and 1/4% sales tax. Prices and availability subject to change without notice-so call before placing your order. Not responsible for typographic errors. Returns of defective merchandise must have prior return authorization number. IBM PC/XT, IBM PC/AT are registered trademarks of International Business Machines Corp.

UTILITIES UNLIMITED

P.O. BOX 422
BRUSH PRAIRIE, WA 98606

Orders Shipped in 2 to 7 working days
(206) 254-6530
C.O.D. orders accepted 24 hrs.

VISA MasterCard

$19.99 PARAMETERS R' US (100 pack)

The Newest and Most Effective Parameter Copier to date, is now ready for shipping. Parameters R' Us, will ELIMINATE all the protection of the most popular and most protected software available for the C-64/128. Parameters R' Us is completely menu driven and easy to use by anyone.

FEATURES INCLUDE: works in seconds, eliminates protection, menu driven, works on 1541 and the 1571, copies made are fully compatible with 3rd party drives, and updated every 2 months. Now available for the Atari ST $24.95.

$4.99 PARAMETERS R' US (10 pack)

The 10 pack is for those that can't wait 2 months for the next release of the next (100 pack). This package will be released every 1 to 2 weeks and will include those titles that were just released.

$9.99 PARAMETERS R' US (GEOS pack)

This Parameter disk was designed just for GEOS and all its Utility packages. Not only will it eliminate the protection, but will also allow use of GEOS UTILITIES (desk pack, writers workshop, geo dex) with any GEOS that has been FIXED with this set of parameters.

$9.99 PARAMETER KRUNCHER

Takes the protection out of Keymaster keys and Fast Hackem parameters and allows you to compile 600 keys and/or parameters on a disk.

$29.99 LOCK PIK C64/128 (The Book)

Lock Pk 64/128 was put together by Utilities Unltd. as a tool for those who have a desire to find out how the heavy Hackers do it. This package includes:

1. Lock Pik book that gives you step by step instructions on BREAKING or backing up over 100 popular programs using Hesmon and Superedit. The instructions are so clear and precise that anyone can use it.

2. Lock Pick disk has Hesmon 64, Superedit, Disk Compare, Kernal Save, I/O Save, and Disk File log with detailed instructions on how to use these programs all on 1 disk.

3. We also have a limited supply of Hesmon cartridges that will be given out free while supply lasts.

I think you will agree this is the best buy to come along in a long time, you get it all for $29.99.

FACTORY AUTHORIZED

COMMODORE REPAIR CENTER

1-800-772-7289
IN ILLINOIS (312) 879-2888

C64 Repair (pcb only)	42.95*	AMIGA Repair	CALL
1541 Repair	79.95*	Other CBM Equip.	CALL
1541 Permanent Alignment	29.95*	C64 Power Supply	34.95
C128 Repair (pcb only)	79.95*	CBM & AMIGA PARTS	Call (312) 879-2350

*Includes parts, labor & UPS return shipping. APO/FPO or Air Freight add $10.00

CALL BEFORE SHIPPING, VISA, MASTERCARD OR MONEY ORDER
24-48 Hrs. Turnaround (Subject to parts availability)
Diagnosis fee of $25.00 for any unit altered or with no defects.

SAVE YOURSELF SOME MONEY

Due to our vast experience in repairing 64s we have found that the power supply is a major cause of board failures. By inserting our device between the power supply and computer over 63% of our customer's repairs would have been avoided. For only $19.95 our Over Voltage Sensor will continuously monitor your power supply output. If an overvoltage occurs the Over Voltage Sensor will prevent damage to your 64.

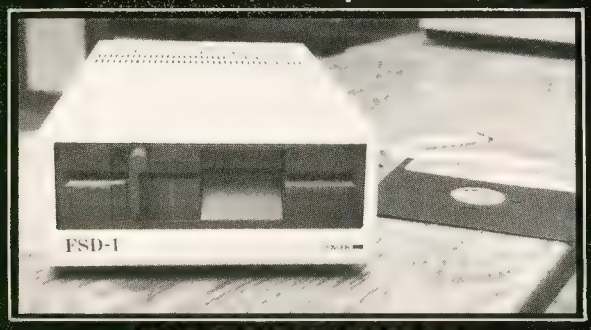
64 OVER VOLTAGE SENSOR $19.95
(Plus $3.00 Shipping/Handling)

TEKTONICS PLUS, INC.

150 HOUSTON STREET
BATAVIA, IL 60510

CLIP AND SAVE

Commodore Compatible and only. . . $149.00



FSD-1 5¼"Disk Drive
Directly replaces the Commodore 1541 disk drive.

The FSD-1 Disk Drive is a versatile and efficient disk drive built for the Commodore series of personal computers. This disk drive is fully compatible with the Commodore 64® computer and directly replaces the Commodore 1541 Disk Drive.

Special Features

- Runs all C-64 commercial software
- Ready to run right from the box
- Full 6 month warranty
- Heavy duty construction
- Vented metal chassis
- Built especially for C-64 users

Visa & MasterCard welcome. Credit card orders shipped in 24 hrs. Allow $12.00 shipping and handling. Send mail order with payment to:

To Order call toll free
1-800-356-5178

ECI

Emerald Component International
Dept. S
541 Willamette Street
Eugene, OR 97401
Tel. 503-683-1154

COMMODORE 64 is a registered trademark of Commodore Electronics, Ltd.

OUR PRICES WON'T BYTE

ABACUS

Basic 128	$42.95
Basic 64	29.95
Cadpak 128	45.95
Cadpak 64	29.95
Chartpak 128	29.95
Chartpak 64	29.95
Cobol 64	29.95
Cobol 128	45.95
Super C Compiler 64/128	42.95
Super Pascal	45.95

BRODERBUND

Where in the World is Carmen Sandiago	$21.95
P/S Library 1-2-3 ea	15.95
Print Shop	26.95
Print Shop Companion	21.95
Toy Shop	39.95
P/S Holiday Library	15.95

MICROLEAGUE

General Manager Disk	$24.95
Micro League Baseball	24.95
Team Disks	16.95

RIBBON

Axiom Elite 5 LCD	$ 5.95
Brother 15, 25, 35	5.95
Commodore 1525	6.95
Commodore 1526	6.95
Epson 185	6.95
Epson 85	4.95
Epson mx, fx, rx 100	6.95
Epson mx, fx, rx 80	4.95
Gorilla Bananna	6.95
Juki 6000	4.95
Juki 6100	3.95
Legend 880, 1080, 808	6.95
MPS 801	6.95
MPS 803	6.95
OKI 182, 192	9.75
OKI 82, 92, 83, 93	2.25
SG 10-15	2.25

(Min. 6 per order)

INFOCOM

Enchanter	21.95
Hitchhiker's Guide	21.95
Invisiclues ea	6.00
Leather Goddesses of Phobos	21.95
Spellbreaker	26.95
Trinity 128	24.95
Zork 1-2-3 ea	25.95

DATAEAST

Commando	$21.95
Karate Champ	21.95
Kung Fu Master	21.95
Tag Team Wrestling	21.95

GAMESTAR

Baseball	$21.95
Basketball 2 on 2	21.95
Football	21.95

PRECISION

Superbase 128	$56.95
Superbase 64	46.95
Superscript 128	47.95
Superscript 64	46.95

TIMEWORKS

Data Manager 128	$42.95
Data Manager II	29.95
Partner 128	42.95
Swift Calc 128 w/Sideways	42.95
Swift Calc 64 w/Sideways	29.95
Word Writer 128 w/Speller	42.95
Word Writer 64 w/Speller	29.95

DIGITAL SOLUTIONS

Pocket Filer 128	$31.95
Pocket Filer 64	24.95
Pocket Planner 128	31.95
Pocket Planner 64	24.95
Pocket Writer 128	31.95
Pocket Writer 64	24.95

MICROPROSE

Conflict in Vietnam	24.95
Crusade in Europe	24.95
F-15 Strike Eagle	21.95
Gunship	21.95
Silent Service	21.95
Top Gunner	18.95

SPRINGBOARD

Certificate Maker	$29.95
Clip Art I	20.95
Clip Art II	24.95
Clip Art III	24.95
Newsroom	29.95
Graphic Expander	21.95
Certificate Maker#1	21.95

ACCESS

Leader Board	$24.95
L.B. Tournament Disk	14.95
Mach 128	30.95
Mach 5	21.95
10th Frame	24.95
Triple Pack	14.95

HOT SELLERS

Star Fleet 1	$29.95
Commando	21.95
Gato	19.95
Kung Fu II	19.95
Tag Team Wrestling	21.95
Strike Force Cobra	13.95
X-15 Alpha Mission	19.95

DATASOFT

Alternate Reality	$24.95
Conan	27.95
Crosscheck	19.95
Goonies	18.95
Mercenary	18.95
Mind Pursuit	18.95
Never Ending Story	18.95
Gunslinger	19.95
221B Baker St	19.95
Theatre Europe	21.95

ACCESSORIES

WICO Boss Joystick	$11.50
WICO Bat Handle Joystick	15.50
WICO Three Way Joystick	18.95
Xetek Graphic Interface	54.95
Xeket Graphic Jr	34.95
RS 232 Interface	34.95
Master Moderm	34.95
Flexidraw Light Pen	74.95
Disk Notcher	5.95
AICP Disks (10)	7.95
Drive Cleaner	7.95
Disk Storage Case (70)	8.95

ELA

Bard's Tale	$24.95
Chessmaster 2000	26.95
Lords of Conquest	24.95
Marble Madness	21.95
Mind Mirror	21.95
Moebius	26.95
Movie Maker	24.95
Orge	26.95
Ultima IV	39.95
Ultimate Wizard	22.95
Bard's Tale II	27.95
Auto Duel	34.95
Scrabble	22.95
America's Cup	22.95
Artic Fox	22.95

MINDSCAPE

Bop and Wrestle	$18.95
Dolphins Rune	18.95
Fairlight	18.95
High Roller	18.95
Indoor Sports	18.95
Infiltrator	18.95
Halley Project	18.95
Lords of Midnight	17.95
Quake 1	17.95
Luscher Profile	18.95

BERKELEY SOFTWARE

GEOS	$36.95
GEOS Fontpak 1	18.95
GEOS Desk Pack	22.95
Writer Work Shop	31.95
Geodex	24.95

AVALON HILL

Superbowl Sunday	$19.95
Team Disk	12.95

SOLID STATE SOFTWARE

VizaStar 128	$79.95
VizaWrite 128	59.95

ACCOLADE

Dambusters	$18.95
Fight Night	18.95
Hard Ball	18.95
Law of the West	18.95
PSI 5 Trading Comp	18.95
Kill Until Dead	18.95
Ace of Aces	18.95
Decptor	12.95

ACTIVISION

Alter Ego	$29.95
Cross Country Road Race	19.95
Mindshadow	19.95
Murder on the Mississippi	21.95
Rocky Horrow Show	18.95
Shanghai	21.95
Spindizzy	18.95
Transformers	21.95
Tass Times in Tonetown	21.95
Gamemaker	24.95
Gamemaker Sci/Ficition	14.95
Gamemaker Sports	14.95
Hacker II	21.95
Music Studio	21.95
Aliens	21.95
Labyrinth	21.95
Howard the Duck	21.95
Portal	25.95

EPYX

Fast Load	$23.95
Multiplan 64/128	29.95
Programmers Toll Kit	27.95
Vorpal	21.95
World Karate Championship	18.95
World's Greatest Baseball	23.95
Super Cycle	24.95
World Games	24.95
World's Greatest Football	24.95
Movie Monster	24.95
Championship Wrestling	24.95
Destroyer	24.95
Winter Games	23.95

FIREBIRD

Elite	$19.95
Colossus Chess-IV	21.95
Frankie Goes to Hollywood	21.95
Music Systems	24.95
Advance Music Systems	49.95
The Pawn	28.95
Battle of Britain/ Battle for Midway	13.95
ARC of Yesod/ Nodes of Yesod	13.95
StarGlider	24.95
Tracker	24.95

SUBLOGIC

Flight Sim II	$34.95
Football	27.95
Jet	27.95
Pure Stat Baseball	34.95
Scenery Disk 1-6 ea	14.95
Stadium Disk (baseball)	14.95

BATTERIES INCLUDED

Paperclip II	$49.95
Consultant 64/128	36.95
Paperclip w/Spell 64	28.95

CALL US TOLL FREE

Orders 1-800-634-AICP Only

Customer Service

718-351-1864

10AM to 6PM

E.S.T.

AMERICAN INTERNATIONAL COMPUTER PRODUCTS

P.O. Box 1758

Staten Island, N.Y. 10314

ORDER INFO

In stock items shipped within 24 hrs. for prepaid orders (cert. check, visa, mc) C.O.D. Orders accepted, please add $4.00, must be cash or cert. check ONLY. NYS residents add 8¼% sales tax. Advertised prices reflect a 4% discount for cash, credit card add 4%. All orders add $3.50 shipping and handling within the Continental U.S. International orders add $15.00 shipping and handling. Personal checks allow 2 wks. for clearance. Availability and pricing subject to change without notice. Free shipping in Continental U.S. on software orders over $150.00. DEFECTIVE EXCHANGE ONLY FOR SAME PRODUCT. Restocking fee on unopened no-defective items returned. Returns accepted within 15 days of shipping date only. All returns require Return Authorization numbers. School inquires invited. WE DO NOT GUARANTEE COMPATIBILITY.

NOTE Monitor not available The Plus/4™ can hook up to your TV
FREE!
WITH PURCHASE OF COMPLETE SYSTEM
20 TOP GRADE FLOPPY DISKS
RETAIL VALUE
$59.90
Ideal for home or business! Perfect for programmers!

COMMODORE PLUS/4

COMPLETE COMPUTER SYSTEM

AT BELOW DEALER COST!

Factory new!

Factory warranted by Commodore®. Built-in software for word processing, data processing, spreadsheets and 128 color graphics!

Commodore® designed this Plus/4™ specifically for **programmers and small businesses!** And then they made it **VERY EASY** to learn and use for novices. Popular business software is available for a variety of purposes. For programmers, this machine has easy-to-use powerful commands and 60K of usable memory. Can hook up as many as four disk drives

Team up the computer with our compatible units of famous brand, factory reconditioned and warranted **DISK DRIVE** and **DOT MATRIX PRINTER!** Sorry, we can't print the brand name of the disk drive and printer. But phone us Toll-Free and we can tell you. With Disk Drive for data storage and Printer for "hard copies", you'll have a complete system...at low liquidation prices. Order **TODAY!**

Additional Features of
COMMODORE PLUS/4
Data base of 999 records. Computer holds 99 lines of text before it must be transferred to disk drive. Excellent terminal for use with modem. 128 colors available for graphics. Split screen and windowing capabilities. Compatible with all Commodore hardware except joystick and dataset. NOT compatible with C64 software

DISK DRIVE
Intelligent, high-speed External 5¼" floppy diskette recorder. 2K RAM, 16K ROM. Maximum storage of 170K formatted data. 35 tracks. Uses single sided, single density disk. Serial interface. Second serial port for chaining second drive or printer. Data transfer rate of 400 bytes per second

DOT MATRIX PRINTER
Bi directional 6 x 7 dot matrix impact printer. 60 characters per second. Has upper and lower case letters, numerals and symbols. All PET graphic characters. Standard friction feed. Maximum of 80 columns width, dot addressable. CBM, ASCII character codes. Original plus maximum of two copies. Paper width: 4.5" to 8.5". Size: 13"W x 8"D x 3¼"H. Weight: 6½ lbs

Units sold individually or in any combination you desire.	Original List Price	YOUR COST
PLUS/4 COMPUTER Item H-1046-5035-001 Ship. hand $8.00	$299.00	$79
DISK DRIVE Item H-1046-3553-013 Ship. hand $8.00	$269.00	$169
PRINTER Item H-1046-3831-005 Ship. hand $7.00	$200.00	$119
TOTAL Ship. hand $23.00	$768.00	$367

JOYSTICK
Deluxe cosmetic, Robust construction Joystick. Comfortable rugged hand grip, 8-Directional control, will automatically come back to the center when you let it free. Heavy duty base with strong/stabilizing suction cups. Four highly sensitive, light touch fire buttons. Two fire buttons on heavy duty base. Other two fire buttons on control handle. Extra strong, high conductivity leaf type directional fire contacts be built in. Auto and quick fire electronic circuit included.

JOYSTICK $12.95
Item H-1046-4035-001 Ship. hand: $3.00

COMPLETE SYSTEM
WITH 20 FREE FLOPPY DISKS
Total Original List . . . $827.90
Liquidation Priced At Only . . . $349
Item H-1046-5035-019 Ship. hand $19.00

Credit card customers can order by phone.
MasterCard VISA

Toll-Free: 1-800-233-6345

S & S LIQUIDATION DIVISION
A division of S & S Wholesalers
226 Lincoln Rd., Miami, FL 33139

S & S LIQUIDATION DIVISION Item H-1046
A division of S & S Wholesalers
226 Lincoln Rd., Miami, FL 33139

Send ___ **COMPLETE SYSTEM(s)** Commodore® Plus/4™ Disk Drive, Printer and Floppy Disks Item H-1046-5043-019 at **$349** each plus $19 each for ship, handling
Send ___ **Commodore® Plus/4™ COMPUTER(s)** Item H-1046-5035-001 at $79 each plus $8 each for ship, handling.
Send ___ **DISK DRIVE(s)** Item H-1046-3553-013 at **$169** each plus $8 each for ship, handling.
Send ___ **PRINTER(s)** Item H-1046-3831-005 at **$119** each plus $7 each for ship, handling
Send ___ **JOYSTICK(s)** Item H-1046-4035-001 at **$12.95** each plus $3.00 each ship, handling
Charge: [ ] MasterCard® [ ] VISA® [ ] C.O.D.
Acct No _____ Exp. ___/___
PLEASE PRINT CLEARLY
Name _____
Address _____
City _____
State _____ ZIP _____
Phone (___) _____
Sign Here _____

1541 DISK DRIVE ALIGNMENT PROGRAM

A complete disk drive alignment program! No special equipment needed! A two disk (program and calibration) program allows anyone with average mechanical skills to properly align the 1541 disk drive. Complete intstruction manual. Don't be fooled by cheap imitations! This is the alignment program that works!

$44.95

PROGRAM PROTECTION MANUAL FOR THE C-64 . . . . . $29.95

PROGRAM PROTECTION MANUAL VOLUME 2 . . . . . $34.95

SNAPSHOT 64 . . . . . $49.95

SNAPSHOT 64 ENHANCEMENT DISK $14.00

SOURCE GENERATOR $34.95

EPROM PROGRAMMER HANDBOOK $32.95

CARTRIDGE BACKER II $54.95

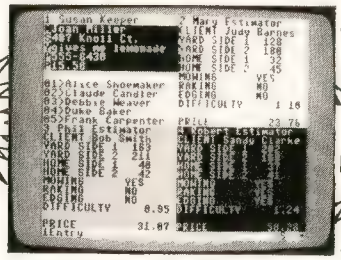
CSM SOFTWARE

P.O. Box 563, Crown Point, IN 46307
(219) 663-4335

VISA AND MASTER CARDS ACCEPTED
DEALER INQUIRIES INVITED
Shipping $3.50 Per Item in U.S.; Foreign Orders Extra

We Do Windows...Quickly!

FREE DISK COPIER



NOT COPY PROTECTED

C-MORE

An Operating System for the Commodore 64.

- **USE YOUR COMMODORE LIKE A PC!**
- Let C-More teach you all about business computing! Control multiple applications in windows. Word Processing, Spreadsheet, Database, Scientific Calculator, Disk Utility and Comparative-Buyer programs are all included!
- Comprehensive 450-page manual provides tutorials, step-by-step instructions, examples and illustrations, for any level user!
- **WRITE COMMODORE BASIC PROGRAMS FOR C-MORE!!**

1-800-628-2828 ext. 790

VISA Visa and Mastercard Accepted MasterCard
or mail $49.95 plus $4.50 shipping & handling
($6.00 shipping in Canada)
(Georgia residents add $2.00 sales tax)

C-More Products, P.O. Box 81548 Chamblee, GA 30366

Please allow 4-6 weeks for delivery.
"Commodore" is a trademark of Commodore Electronics, Ltd.

Commodore Product Potpourri

Hardware, Software & Firmware for your C-64, C-64C, C-128, AMIGA

256-K AMIGA™ MEMORY

It all began 9 years ago when Commodore produced a wondrous **PET** Computer with 8 Kbytes of memory. **Skyles Electric Works** then offered to double the **PET** memory with an 8 Kbyte memory addition.

History repeats itself 8 years later. At 1/3 the price of the original PET memory expansion, Skyles Electric Works now offers 32 times the memory. That's right!! **256 Kbytes of AMIGA memory** expansion for only **$79.95*.**

Buy your 256 Kbyte AMIGA memory expansion from **Skyles Electric Works** at the **lowest price** from the **most reliable** and **most proven** Commodore expansion memory builder in the world.

256-K Memory for AMIGA $79.95*

A panoramic passel of pelucid paragraphs presented by a premier purveyor

MEGABYTES for AMIGA

Available now from Skyles Electric Works. We had so much fun developing the **256-K Memory for Amiga** that we decided to offer **½ Mbyte, 1 Mbyte, and 2 Mbyte, Memories for Amiga.** Consider, 524,288, 1,048,576 or 2,097,152 bytes of memory designed to plug directly into the right side of the **Amiga**. ½, and 1 Megabyte memory boards offer full 86 pin pass-thru. All with Addmem or **Auto-config** on turn on. We searched America for the best **Amiga Memory** and found it.

½ Megabyte Amiga Memory . . . $349.95*
1 Megabyte Amiga Memory $449.95*
2 Megabyte Amiga Memory $549.95*

MIDI for AMIGA

A Standard MIDI IN, 2 MIDI OUT, and MIDI THRU Interface for the **Amiga** Computer. Plug it into the RS-232 Port on the rear of your **Amiga** and you are ready to use Musical Instrument Digital Interface (MIDI) instruments and devices with your **Amiga**. Designed to be used with standard MIDI cables and all the presently available **Amiga** MIDI software. The **MIDI for Amiga Interface** gets the job done at a bargain price.

MIDI for Amiga Interface $49.95*

CLOCK for AMIGA

We Were Shocked When We Discovered that the otherwise friendly **Amiga** "would not even give us the time of day". We immediately set about fixing the problem with **Clock for Amiga**. No longer is it necessary to set the clock via Preferences. With **Clock for Amiga** you can have the time of day set automatically each time you turn on your **Amiga**. **Clock for Amiga** is a small cartridge that plugs onto the joystick port on the right side of your **Amiga**. **Clock for Amiga** runs for two years even if your **Amiga** is turned off. Get **Clock for Amiga** today and let your **Amiga** be an amiga.

Clock for Amiga $59.95*

2 for 1 MONITOR CABLE/C-128

The **2 for 1 Monitor Cable** allows all composite video monitors to be used with the **Commodore 128** in all modes of operation. Don't throw out your present green or amber monitor, buy a **2 for 1 Monitor Cable.**

2 for 1 Monitor Cable for C-128 . . $24.95*

Skyles Electric Works

1541 FLASH!

The new Skyles Electric Works **1541 FLASH!** loads programs and files to your **Commodore 64/64C or Commodore 128** (64 mode) three times faster than an unenhanced Commodore 1541 disk drive. **1541 FLASH!** saves programs 20 to 50 percent faster. **1541 FLASH!** formats a diskette in 25 seconds, a real flash.

The **1541 FLASH!** is a permanent hardware installation in your **Commodore 64/64C** and **Commodore 128** (64 mode) and **1541 disk drive.** No programs to load, no cartridge hassles.

We have special versions of the **1541 FLASH!** for the **SX-64** and two **1541s**.

In addition to its blinding speed of program and file loading, the **1541 FLASH! adds over 50 extra commands for the Commodore 64/64C/128** user. These include a built-in DOS/Wedge, Easy Editor, and FLASHMON! machine language monitor.

1541 FLASH! C-64/C-64C & 1541 . $69.95*
1541 FLASH! C-64/C-64C & two 1541s $109.95*
C-128 FLASH! C-128 & 1541 . . . . . $79.95*
C-128 FLASH! C-128 & two 1541s $119.95*
SX-64 FLASH! SX-64 & 1541 . . . . $69.95*
SX-64 FLASH! SX-64 & two 1541s $109.95*

A powerful panoply of pertinent, potent, peripheral products

QUICKSILVER 128

QUICKSILVER 128 our premier IEEE-488 Interface for the **Commodore 128** is now in stock and even better than we had planned. **Quicksilver 128** offers an IEEE Interface for the **Commodore 128** in the C-128 mode (40 or 80 columns) and in the C-64 mode as well. **QUICKSILVER 128** will inter-connect your **Commodore 128** to Commodore SFD 1001, 2031, 2040, 3040, 4040, 8050, 8250, 9060, 9090 Disk Drives, and 2022, 2023, 4022, 4023 and 8023 Printers.

QUICKSILVER 128 C-128 . . . . . $119.95*

A priceless programmers pallett of practical products and programs

IEEE Flash! 64

IEEE Flash! 64 our premier IEEE-488 Interface for the **Commodore 64** is now in stock and even more transparent (program compatible) than QUICKSILVER 64. **IEEE Flash! 64** will inter-connect your **Commodore 64** to Commodore SFD 1001, 2031, 2040, 3040, 4040, 8050, 8250, 9060, and 9090 Disk Drives, and 2022, 2023, 4022, 4023, and 8023 Printers.

IEEE Flash! 64 C-64/C-64C $99.95*

2+1, 4+1 CARTRIDGE EXPANSION

Our 2+1 Cartridge Expansion gives you 2 vertical and 1 horizontal fully switchable cartridge ports. Our 4+1 Cartridge Expansion gives you 4 vertical and 1 horizontal fully switchable cartridge ports.

2+1 Cartridge Exp. C-64/C-64C or C-128 . . . . . $39.95*
4+1 Cartridge Exp. C-64/C-64C or C-128 . . . . . $69.95*

DRUM MACHINE

Rhythm King *is a drum machine for the C-64 and C-128.* Rhythm King is a disk and an audio output cartridge that plugs into your **C-64 or C-128.** Rhythm King has 8 different percussion sounds built-in and **Rhythm King** will play up to 3 drums at a time. You may write "patterns" of up to 24 bars, with up to 32 notes per bar, with up to 64 steps per note. Up to 64 different patterns may be linked together into a "song", with up to 255 repeats per pattern. Songs may be linked together to form "Megasongs" of up to 255 pattern steps.

RHYTHM KING 128 C-128 . . . . . $89.95*
RHYTHM KING 64 C-64 . . . . . $89.95*

Prevent and preclude premature pratfalls, by perplexed programming postulants

BASIC PROGRAM COMPILER

BLITZ! is the fastest, easiest to use, most popular, BASIC program compiler available for the **Commodore 128, C-64, and C-64C.** Your **BLITZ!** compiled programs will run from 5 to 20 times faster after you **BLITZ!** them. **BLITZ!** translates and reduces your BASIC programs in to a much, much faster code.

BLITZ! C-128, Disk $59.95*
BLITZ! C-64/C-64C, Disk $49.95*

BASIC PROGRAMMING AID

VICTREE is a BASIC programming aid cartridge for the VIC-20 and C-64/C-64C computer. **VICTREE** adds 42 extra commands for BASIC programming ease and full DOS control. **VICTREE** commands include CHAIN, EXECUTE, MERGE, SEND, USE, CONCAT, DOPEN, DCLOSE, RECORD, HEADER, COLLECT, BACKUP, COPY, APPEND, DSAVE, DLOAD, DIRECTORY, RENAME, SCRATCH, CATALOG, INITIALIZE, AUTO, DELETE, RENUMBER, MERGE, LCOPY, LMOVE, PRINT USING, FIND, CHANGE, PAGE, HELP, DUMP, and TRACE.

VICTREE 64 Cartridge, C-64/C-64C . $49.95*
VICTREE 20 Cartridge, VIC-20 . . . . $49.95*

ASSEMBLER CARTRIDGE

If your C-64 programming needs have extended beyond BASIC, Skyles Electric Works now offers **MIKRO**, a machine language assembler cartridge for the Commodore 64/64C. The **MIKRO** cartridge contains everything you need for machine language programming.

MIKRO Cartridge, C-64/C-64C $49.95*

The periodically puzzling, precarious, path to perspicacious program perfection and prowess

FAMILY TREE

Truly a program for the whole family, your wife's family, your parent's family, grandparent's family, and as many generations back as you wish. FAMILY TREE is the best genealogy program for the **C-64/C-64C**or **C-128**. Features unlimited genealogies, 4, 5, 6, generation pedigrees, family record sheet and much more.

FAMILY TREE, C-64/C-64C/1541, . . . $49.95*
FAMILY TREE, C-64/C-64C/1541 (LDS) $49.95*
FAMILY TREE, C-128/1541/1571 . . . . $49.95*

***There is an additional $4.50 U.S. and Canada, $15.00 Europe and Asia, shipping charge per order. California residents add sales tax.**

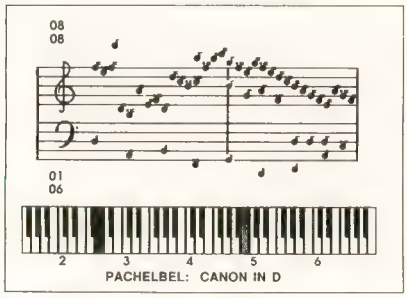
TO ORDER: Call 1-800-227-9998 or 1-415-965-1735 (CA) or write to:
For More Information: Send Stamped Self Addressed Envelope to:

231-E South Whisman Road, Mountain View, CA 94041

TWO GREAT MUSIC PROGRAMS

from TCO SOFTWARE

The EUPHONY™ series music programs play pieces up to 50 minutes long with every note shown simultaneously on the music staff and keyboard. Notes change color as they are played. Play any portion, change instruments, key and tempo to suit your taste. Select from 9 instruments or create your own with the full power of the Commodore™ sound chip. Music can be programmed to play for hours at a time. Each program comes with Euphony Music Collections 1, 2 and 3. Music Collection 4 is available separately.



PACHELBEL: CANON IN D

What our customers say about Euphony

"Best on the market!" -S.V. Newark, NJ

"Best on the market!" -P.G., Niles, IL

"Superb! Great! Beautiful!" -C.H., Coral Gables, FL

"Thank you so much for such an excellent product! It's tremendous!" -L.L., Rocksprings, TX

"Delighted with (Euphony)..It is the best and simplest music software I have yet come across" -M.L., Castle Cove, Australia

"Thoroughly enjoyed it...Excellent manual...Euphony caused me to completely reassess the ability of the C-64...Fantastic for serious music listeners, students, programmers" -M.C., Los Altos, CA

"Best combination of ease-of-use and versatility I've seen yet...Way above anything else" -D.T., Juneau, AK

"It's a great program. I love it" -C.L., Parsippany, NJ

"I love your program! Am spreading the word" -M.H. Baltimore, MD

"Euphony+ is the best music program I've seen for the Commodore. I really enjoy the flexibility it gives you in transcribing music" -M.Z., Peru, IN

"I'm delighted with the Euphony Jr. and Music Collection 3--truly amazing. A superb job you've done" -B.G., Barrie, Ont.

"I have enjoyed it immensely! You have done a great job!" -T.E., Rome, GA

"I can't tell you how wonderful the music is" -M.F., Ottawa, Ont.

"I love it. Of the various music programs I have, yours is the most complete and the easiest to use. It has many features not found on other programs" -J.J., N. Highlands, CA

"Euphony is the best music program I've had" -R.C., Ingalls, KS

EUPHONY JR. **$19.95** plus $2.00 shipping

3 hours of virtuoso performances. contains many complete works, including Beethoven's Waldstein sonata, several Mozart sonatas, Bach's Brandenburg Concerto No. 3 and Fugue in D minor, Chopin's Fantaisie Impromptu, Handel's Messiah, plus pieces by Debussey, Couperin, Albeniz; popular pieces, hymns and more. Two-disk set plus 20-page manual.

EUPHONY VERSION 3.0. **$39.95** plus $2.00 shipping

Our powerful music processor with many new features and an expanded 3-hour music collection (same as Euphony Jr's). Create and edit long and complex pieces of music. Use dotted 32nd notes, triplets, legato/staccato, repeats, etc. Full screen editing of music code, automatic error detection and more! Two disk set plus 44-page manual.

EUPHONY+ Same as Euphony ver. 3.0 plus prints music scores on Epson™ and Star Micronics™ printers. $44.95 plus $2.00 shipping.

MUSIC COLLECTION 4. Over 60 minutes of additional music for Euphony or Euphony Jr. Moonlight sonata, Bach bourees, more pieces by Mozart, Schumann, etc. $7.50 + $1 shipping.

FOR COMMODORE 64 AND 128 COMPUTERS

15-DAY MONEYBACK GUARANTEE

VISA, MASTERCARD accepted. All orders shipped immediately via first class mail. COD and overseas orders please add $2.00

TCO SOFTWARE

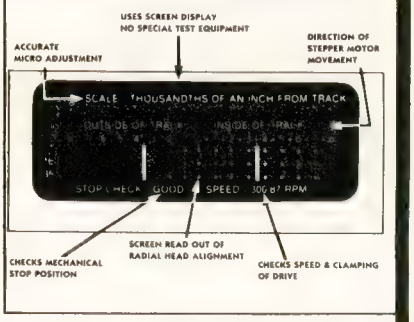
Dept. B, P.O. Box 81504, Fairbanks, AK 99708

907-479-4898

"I Saved Time & Money with PHYSICAL EXAM"

Disk drive read errors are a frustrating waste of time! I use a data base to keep records for our club. Last week I experienced read errors on my disk drive. Luckily I have a 1541 Physical Exam program. The alignment test confirmed what I had suspected, my drive was out of alignment. I am happy to report that I aligned my drive MYSELF. I avoided the wait for repair and paid a fraction of the cost.

1541 Physical Exam Sample Screen


USES SCREEN DISPLAY NO SPECIAL TEST EQUIPMENT
ACCURATE MICRO ADJUSTMENT
DIRECTION OF STEPPER MOTOR MOVEMENT
SCALE THOUSANDTHS OF AN INCH FROM TRACK
OUTSIDE OF TRACK
INSIDE OF TRACK
STOP CHECK GOOD SPEED 306.87 RPM
CHECKS MECHANICAL STOP POSITION
SCREEN READ OUT OF RADIAL HEAD ALIGNMENT
CHECKS SPEED & CLAMPING OF DRIVE

Package includes: • True digital alignment disk with offset tracks. • Mechanical Stop Test • Speed Test • Illustrated manual with instructions for performing alignment, adjusting speed and stop position. • Print test results for future reference.

Physical Exam is available for these drives: 1541, 1571, 8050, 8250, 4040, SFD 1001. *Please Specify Drive!* **$39.95** EA. + SHIP.

See Reviews in: Run Special Issue #3, 1/87, p.83; **Info #11**, Aug/Sept 86, p.46 **Midnite Gazette**, April 1986, p. 19.

Cardinal Software
14840 Build America Dr.
Woodbridge, VA 22191
Info: (703) 491-6494

Order Toll Free 10 - 4 MON-SAT

800 762-5645

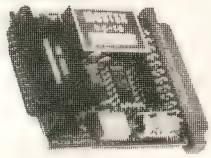
COMMODORE ACCESSORIES

COMMODORE CHIPS

For VIC-20, C-64 & C-128 Personal Computers and Peripherals

Part No.	Price
WD1770 Disk Controller	19.95
SI-3052P 5V Positive Voltage Reg. 2A.	5.95
6502 MPU w/Internal Clock	2.25
6504A CPU.	1.95
6507 CPU.	4.95
6510 CPU.	9.95
6520 PIA.	1.75
6522 VIA.	2.95
6525 TPI.	7.95
6526 CIA.	14.95
6529 SPI.	4.95
6532 128x8 RAM, I/O, Tim Ar.	6.49
6545-1 CRTC.	2.49
6551 ACIA.	3.29
6560 VIC-I.	10.95
6567 VIC-II.	14.95
6569 VIC PAL.	14.95
6572 VIC PAL-N.	14.95
6581 SID.	14.95
8360 Text Editing.	10.95
8501 MPU.	10.95
8502 MPU.	7.95
8563 CRT Cont.	15.95
8564 VIC.	15.95
8566 VIC PAL.	29.95
8701 Clock Chip.	9.95
***8721** PLA.	14.95
8722 MMU.	9.95
***251104-04** Kernal ROM.	10.95
318018-03 Basic ROM-C128	15.95
318019-03 Basic ROM-C128	15.95
318020-04 Kernal ROM-C128.	15.95
325302-01 64K ROM for 1540/1541 Drive.	15.95
***325572-01** Logic Array.	24.95
***82S100PLA** (906114-01)**	13.95
901225-01 Char. ROM.	11.95
901226-01 BASIC ROM.	11.95
901227-03 Kernal ROM.	11.95
901229-05 Upgrade ROM (For 1541 Disk Drive).	15.95

*No specs. available
**Note: 82S100PLA = U17 (C-64)



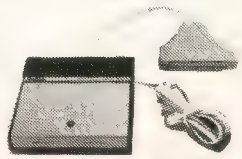
RS232 Adapter for VIC-20, C-64 and C-128

JE232CM allows connection of std. serial RS232 printers, modems, etc. to your VIC-20, C-64 (excl. SX-64 Portable), and C-128. Operation with the C-128 in 64 mode only

JE232CM. $39.95

300 Baud Modem for VIC-20 & C-64

• Connects directly to User Port • Manual Answer/Dial • Function keys defined for convenience • Includes Midwest Micro Associates communication software.



CM-1. . . . . $24.95

External Power Supply for C-64

• Input: 117VAC @ 60Hz • Output: 5VDC @ 3A, 10 VAC @ 250mA • Short circ. protected • Transient spike suppression on 2 aux. 110 VAC sockets • 1 year warr.

CPS-10. . . . . $39.95

External Power Supply for C-128

• Input: 117VAC @ 60Hz • Output: 5VDC @ 6A, 10VAC @ 2A • Short circ. protected • Transient spike suppression on 3 auxilliary 110VAC sockets • 1 year warranty

CPS-128. . . . . $59.95

$20.00 Minimum Order — U.S. Funds Only
CA Residents Add 6%, 6½% or 7% Sales Tax
Shipping — Add 5% plus $1.50 Insurance
Send S.A.S.E. for Sales Flyer!

Jameco ELECTRONICS
Mail Order Electronics - Worldwide

Spec Sheets — 50¢ each
Send $1.00 Postage for your *FREE 1987 JAMECO CATALOG*
Prices Subject to Change

©1987 Jameco Electronics

MasterCard VISA

1355 SHOREWAY ROAD, BELMONT, CA 94002
Phone Orders Welcome (415) 592-8097 Telex: 176043

5/87

Sensational Prices!
. . . On Our Most Popular Items!

from microPal® . . .

THE 39¢ DISKETTE!

Are you paying too much for diskettes? Try our first quality, prime, 5¼" diskettes (no rejects, no seconds) at these fantastic sale prices and save, save, SAVE! Disks are packaged in boxes of 50; including diskettes in sleeves, labels, and write-protect tabs.

Each diskette is certified to be 100% error free and comes with a lifetime warranty (if you have a problem, we'll replace the diskette). All diskettes include hub reinforcement rings and write-protect notch.

All diskettes are double density and work in either single or double density drives.

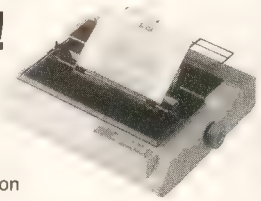
SS, DD Diskettes, Box of 50
32391 **$19.50–39¢ ea.!**

DS, DD Diskettes, Box of 50
32403 **$24.50–49¢ ea.!**

Lowest Cost, Best Performing Star Printer Ever!!

NEW

star MICRONICS INC



NP-10. Ideal for school ***and*** home use, the newest printer in the Star line promises to be a best-seller due to its great features and unbeatable price! You get superb draft printing at 100 cps and its easy to switch to crisp, precise near letter quality at 25 cps. Easy front panel operation allows you to change modes at the simple touch of a button. Tractor and friction feeds standard. Printing is bidirectional in draft mode and unidirectional in bit image and NLQ modes. Five character sets are available in draft mode including italic and international characters, with three sets available in NLQ. 2K buffer. Standard parallel interface. Full one-year warranty. Sug. Retail $279.00

64204 NP-10 Printer **$CALL FOR LOWEST PRICE!**

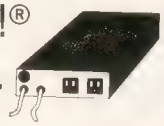
★ THE BEST PRICES ★
★ THE BEST SERVICE ★
WHY SHOP ANYWHERE ELSE?

THE FAMOUS SLIK STIK™ **ONLY $6.95!**

The Slik Stik™ has been a favorite for years. . .and for good reason. It's just the right combination of responsiveness and accuracy. And the price can't be beat! From Suncom. 90 day warranty. Connects directly to Commodore Computers.

42086 **$6.95**

POWER and PROTECTION FOR YOUR C-64!®



POW'R PAK 64

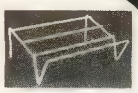
from MicroPal®

Pow'r Pak is a replacement power supply (1.5 amp) for the Commodore 64® . . . but that's not all! Pow'r Pak also supplies two additional surge protected outlets (120V) for monitor, disk drive, or other peripherals. On/off switch. Fuse protection. Sturdy all-metal casing is ventilated for heat dissipation. Full 1 year warranty.

34910 **$49.95**

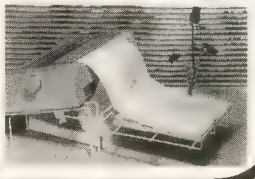
Space Saving Printer Stand

NEW LOW PRICES!



At last a printer stand priced for homes and small offices! This great stand from Suncom is elevated so you can place your paper underneath. Features heavy duty welded steel wire construction and has a vinyl coating to reduce noise and vibration. Another plus. . .the printer is held at an angle that makes it much easier to see your output as it is being printed. Available in two widths: 12" for most 80 column printers, and 18" for most 132 column printers

33232 12" Printer Stand . . . . . (Was $14.95) **ONLY $ 6.95**
33246 18" Printer Stand . . . . . (Was $22.95) **ONLY $12.95**



Paper Tray

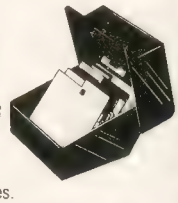
Ever wondered what to do with the printout that comes out of the printer and tends to spill all over the table and floor? The Suncom Paper Tray attaches to the rear of all Suncom stands and receives the printed paper as it comes out of the printer. Helps to neatly fold and stack it! Sug. Retail $14.95

42091 **$11.95**

Our Lowest Price Ever On Diskette Storage!

ONLY $4.95

INNOVATIVE CONCEPTS, INC



FLIP SORT 70

- Stores and files up to 70 5¼" diskettes.
- Includes 5 index dividers for organization of filing and retrieval.
- Molded from highly durable plastic.

Sug. Retail $7.95
Regular Tenex Price $6.95
43375 **SUPER SALE $4.95**

DUST COVER and "EVERYTHING BOOK" SPECIAL OFFER

Get to know us by ordering this great dust cover for your C-64 or C-128 and our catalog, "The Everything Book for the C-64 and C-128 Home Computers," for $2.95 (no extra shipping and handling charges). Cover is antistatic, translucent 8-gauge vinyl sewn to our exacting standards with reinforced seams. Discover the savings and easy shipping available from TENEX Computer Express!

$2.95

31627 C-64 Dust Cover and Catalog (G3A)
38464 C-128 Dust Cover and Catalog (G3A)
65180 C-64C Dust Cover and Catalog (G3A)

The Right Interface For All Your Printing Needs!!

PPI with graphics

". . . a sound investment for your Commodore." RUN, *Dec. '85*

This high-performance graphics parallel printer interface from DSI for C-64 and VIC-20 emulates a Commodore printer. Comes with cables and user's manual

33565 . . . . . **$39.95**

Super Graphix. Features 8K buffer, 10 printing modes, 3 internal screen dumps and top mounted dip switches. Supports superscript, subscript, underlining, bold face, and a choice of 9 character widths From Xetec.

41769 . . . . . **$69.95**

Super Graphix Jr. A more economical version of the Super Graphix, featuring graphics, normal and correspondence quality printing Compatible with all major printers. From Xetec.

41774 . . . . . **$49.95**

From Your Friends At
TENEX Computer Express

We gladly accept mail orders!

P.O. Box 6578
South Bend, IN 46660

Questions? Call 219/259-7051

Ad G3A

SHIPPING CHARGES

ORDER AMOUNT	CHARGE
less than $20.00	$3.75
$20.00–$39.99	4.75
$40.00–$74.99	5.75
$75.00–$149.99	6.75
$150.00–$299.99	7.75
$300 & up	8.75

MasterCard VISA

NO EXTRA FEE FOR CHARGES

WE VERIFY CHARGE CARD ADDRESSES

ORDER TOLL FREE
1-800-348-2778
INDIANA ORDER LINE 1-800-225-6838

Foreign Orders add $4.00. Heavy items ship at actual cost.

COMMODORE 64 is a registered trademark; and COMMODORE 128 is a trademark of Commodore Electronics, Ltd.

GREAT PRODUCTS FOR YOUR COMMODORE

promenade C1™

The Eprom Programmer. Thoughtfully designed, carefully constructed, the *promenade* C1™ is respected around the world for quality and value. The original software controlled programmer does away with personality modules and switches. Intelligent programming capability can cut programming time by 95%! With Disk Software ..... still just $99.50

CAPTURE™

Take control of your '64 or '128* with this easy to use cartridge. Lets you make a back-up disk of your memory-resident software. Your program is then fully accessible to you and your program can be re-booted from your disk 3-5 times faster. Or make an auto-starting cartridge using the *promenade* C1 and a CPR cartridge kit. Its magic!

CAPTURE™ is a bargain at 39.95

CARTRIDGE MATERIALS:

CPR-3 - Three socket board, case and 3 eproms, for use with **CAPTURE™** 29.95
PCC2 - Two 2732 (4K) or 2764 (8K) eproms. For '64 or '128 in 64 mode 4.95
PCC4 - Four sockets for 2764, 27128 or 27256 (32K) eproms. Bank switching 17.95
PCC8 - Like the PCC4 but twice the capacity. For multiple programs 29.95
PRB4 - Four sockets, eprom & battery backed RAM combination 24.95
PTM2 - Basic 128 mode cartridge board. Two 2764 or 27128 eproms ..... 5.95†
PTM4 - Four sockets, 27128 & 27256 eproms. 128 mode bank switcher ..... 19.95†
PCCH2 - Plastic case for above cartridges (except PCC8) 2.25
Eproms - Always in stock at competitive prices.

†available June '86.
*when in 64 mode.

EPROM ERASERS:

Datarase - Hobbyist eprom eraser, 2 at a time, 3 to 10 minutes 34.95
PE14 - Industrial quality eraser, 7 to 9 at a time 79.95
Starter Set - **CAPTURE™**, *promenade* C1 and one CPR3 kit 149.95
Deluxe Set - **CAPTURE™**, *promenade* C1, Datarase and two CPR3 kits 199.95

SHIPPING & HANDLING: USA - UPS SURFACE $3.00 FOREIGN (AIR MAIL ONLY) $13.00

JASON-RANHEIM
1805 INDUSTRIAL DRIVE
AUBURN, CA USA 95603

TO ORDER TOLL FREE 800-421-7731
FROM CALIFORNIA 800-421-7748
TECHNICAL SUPPORT 916-823-3284
FROM OUTSIDE USA 916-823-3285
MC, VISA, AMEX WELCOME

THE AMAZING VOICE MASTER®

ENTER THE FINAL FRONTIER OF MAN-TO-MACHINE COMMUNICATIONS

There is nothing else like it. Voice Master gives both speech output and voice recognition with this single hardware product! Your voice controls programs, or home appliances, robots, and more with spoken commands. Verbal response back gives status, verifies, or requests your reply! Speech output and recognition patterns are recorded in with your voice. Or use the voice of your friend, boss, teacher, mother, even the family pet! Programming is simple with new commands added to BASIC. A music bonus program lets you write and compose musical scores simply by humming the tune. Unlimited applications for fun, education, and commercial use. Design your own programs for profit. Speech and recognition quality unsurpassed by even the most sophisticated machines. Only Covox provides this high-tech marvel at a price less than most common peripherals.

The Covox Voice Master comes complete with all hardware and software for only $89.95. (Add $4 shipping and handling for USA, $6 Canada, $10 overseas.) Available for Commodore 64/128, Apple II, II+, IIc, IIe, Atari 800, 800XL, 130 XE. Specify when ordering. Visa, MasterCard phone orders accepted.

Call or write for FREE Voice Master Infopak and special combination package offers.

COVOX INC., DEPT. CG
675-D Conger Street • Eugene, Oregon 97402 • U.S.A.
Area Code (503) 342-1271 • Telex 706017 (Av Alarm UD)

NEW VERSION 3.0 FOR C64 & C128 IN 128 MODE

THE MIRROR DISK COPIER

$24.95

NO FINER OR MORE ADVANCED ARCHIVAL COPIER AVAILABLE AT ANY PRICE
EASY TO USE. DOES NOT CAUSE DRIVE HEAD TO KNOCK.
COPIES UP TO 41 TRACKS.
PERIODIC UPDATE POLICY
AUTOMATICALLY MAKES BACK-UP COPIES FROM VIRTUALLY ALL PROTECTED SOFTWARE
NIBBLES, HALF TRACKS, COPIES EXTRA SECTORS AND EXTRA TRACKS.
REPRODUCES ALL DISK ERRORS AUTOMATICALLY.
FAST, COPIES FULL DISK IN AS LITTLE AS 4-7 MINS. EVEN COPIES ITSELF

WE COPY MORE!
MASTERCARD, VISA, M.O. OR CHECK OK
+ $3 SHIPPING & HANDLING
C.O.D. OR FOREIGN ORDERS ADD $2
CALIF. ORDERS ADD 6% SALES TAX
— WRITE OR CALL —

Compumed
(408) 758-2436
P.O. BOX 6939
SALINAS, CA 93912
FOR COMMODORE 64 AND 1541 DRIVE
OR COMMODORE 128 AND 1571 DRIVE

NEW

KRACKER JAX® REVEALED!

THE BOOK

At last—**Kracker Jax** takes you beyond the protection barrier! The secrets of un-protecting software are yours with **Kracker Jax** revealed!

We'll show you exactly how to defeat five different protection schemes encompassing scores of current programs. Our tutorial has twenty specific examples to lead you, step by step, to a new level of knowledge. Here's what you get:

- **Kracker Jax revealed.**
- **A reset switch.**
- **A utility disk.**
- **20 parameters on disk.**

ONLY $23.50 COMPLETE!

Orders outside of North America
Please add $7.50 for shipping and handling.
Please allow two weeks for delivery.

Flash—* KRACKER JAX *voted "MOST INNOVATIVE COPY PROGRAM OF 1986" by The Guide Magazine!

AND HERE'S WHAT SOME OF OUR CUSTOMERS HAVE TO SAY ABOUT US:

"I really enjoy doing business with you—your attitude is great!" Richard Libby

"Very impressed with your product—thanks." Larry Lyman, Director, Green Mountain Commodore User's Group

"I am excited about **Kracker Jax Revealed**—thanks again for the great product & great service." Jerry Pectol

"Very nice utility—about time someone looked out for us." John Dale, President, Wiregrass Micro-Comp Society

See our reviews in the Jan. '87 Ahoy! and in the Dec. '86 issue of The Guide.

KRACKER JAX®
PROTECTION BUSTERS
BLAST DISK PROTECTION

ARE YOU CAUGHT UP IN THE COPY PROTECTION ARMS RACE?

DEFEND YOURSELF WITH KRACKER JAX® A REVOLUTION IN ARCHIVAL SOFTWARE!

Kracker Jax is the powerful parameter copy system that is taking the country by storm! What IS a parameter! It's a custom program that allows your 1541 or 1571 disk drive to strip all copy protection from your expensive software, leaving you with UNPROTECTED, TOTALLY BROKEN back-ups that can even be copied with a simple fast copier. Each Volume costs $19.95 and will un-protect around 100 titles. So why pay for backups of programs that you already own?

Check out some of these exclusive features:

- **Kracker Jax** is the BEST program of its kind!
- **Kracker Jax** will back up titles that the nibblers CAN'T!
- **Kracker Jax** requires NO special knowledge to operate!
- **Kracker Jax** strips protection in a matter of SECONDS!
- **Kracker Jax** is priced RIGHT—just $19.95 per Volume
- **Kracker Jax** is UNPROTECTED—easy to back up!
- **Kracker Jax** updates are available QUARTERLY!

VOLUME FIVE INCLUDES A POWERFUL NEW C64/C128 FAST COPIER!

ALL NEW VOLUME FIVE

VOL. 1-4 STILL AVAILABLE. ONLY $19.95 EACH!

KRACKER JAX®
PROTECTION BUSTERS
BLAST DISK PROTECTION

THE SHOTGUN

Those of you who have used our **Kracker Jax** parameters know just how good they are. Can you imagine the kind of nibbler we could put out? Well, you don't have to imagine it because it's HERE! **THE SHOTGUN**, our new premium nibbler utility, is available two ways:

- **THE SHOTGUN** by itself—offered to you at the unheard of introductory price of only $14.95!
- **THE LOADED SHOTGUN**—Packaged WITH 32 of the most popular **Kracker Jax** parameters ever created—only $19.95!

Whichever version you order, you'll find **THE SHOTGUN** to be loyal to the **Kracker Jax** tradition of more quality for less money.

THE MSD DUAL CANNON

MSD owners aren't left out in the cold anymore! The all new **MSD DUAL CANNON** gives you state of the art control over your advanced equipment! You get:

- **A NIBBLER**—for backing up your protected programs!
- **A FILE COPIER**—for easy file maintenance and manipulation!
- **A SECTOR EDITOR**—developed just for the MSD dual drive!
- **And a FAST COPIER**—that WON'T transfer errors—perfect for use with data disk or **Kracker Jax** parameters!

Start getting the full performance that your MSD drives are capable of delivering. You already *know* you own the finest drives available—so why settle for anything less than the best utilities made for them?

Get the most out of your special equipment—only $34.95!

ON-LINE HELP

Are you programming in BASIC? Let your C-64 help you! Forget about all those tattered books and charts—just load **ON-LINE HELP** in at the beginning of a session. Then, at the touch of the F1 key, you're given a menu of available help screens to choose from! When you return to BASIC, you're right back EXACTLY where you left off!

ON-LINE HELP gives you 17 screens of info at the touch of a button, including: *ASCII character set/POKES/color codes/selected DOS commands/useful memory commands/BASIC keywords, abbreviations, and token values/sound registers/musical notes in all 8 octaves/location 197 last key pressed.*

Never waste time hunting for basic information again—only $19.95

SUPER CAT

If you had the time and skill to create your own custom disk catalog system, the paramount system of your wildest dreams, it probably STILL wouldn't have all the features of **SUPER CAT!** For example: • Catalog up to 640 disk directories—1280 with 2 drives! • Index & alphabetize over 5000 titles—10000 with 2 drives! • Unique ID's are NOT necessary!/A printer is NOT required! • Find ANY title in 10 seconds—sort 1000 titles in 8 seconds! • Automatic entry with Selection, Edit, and Cross Ref. options! **SUPER CAT** has literally too many features to fit in here. From the easy, menu driven work screens to the comprehensive output options, **SUPER CAT** is the most powerful and complete disk catalog system available today!

The ultimate software library index system—only $24.99

THE C-128 CANNON

Here's the package you C-128 owners have been waiting for! The **C-128 CANNON** gives you more power than you ever hoped for! Just look at some of these capabilities:

- **NIBBLER**—Works with single or dual 1571/1541 drives!
- **FAST COPIER**—Great for data disks or use with Kracker Jax!
- **FILE COPIER**—Makes file maintenance and manipulation easy!
- **1581 FAST COPIER**—For use with the new high speed 3.5" drive!
- **1581 FILE COPIER**—For high speed file manipulation!
- **MFM COPIER**—Copies unprotected IBM and CP/M disks!
- **T/S EDITOR**—Works with 1541, 1571, and the new 1581 drives!
- **ERROR SCANNER**—Complete with on-screen display!
- **DENSITY SCANNER**—Check for altered densities track by track!
- **DIRECTORY EDITOR**—Alter & organize your disk directories!
- **KRACKER JAX**—You also get 100 of our most popular parameters!

You've seen nibblers alone that sold for thirty-five or forty dollars. And the 100 **Kracker Jax** parameters are a twenty dollar value. Yet the ENTIRE **C-128 CANNON** utility package sells for just $34.95. Never before has this much power and control been integrated into a single, affordable product. If you own a C-128, you deserve the **C-128 CANNON!**

C-128 owners, this is the package of your dreams—only $34.95

COMPUTER MART

Need more info? Call or write for our free catalog

Program submissions wanted! Good Commissions—National Marketing.

CHECKS, MONEY ORDERS OR VISA/MASTERCARD.
Mail your order to: Computer Mart, Dept. G
2700 NE Andresen Road/Vancouver, WA 98661
Phone orders welcome: 206-695-1393
Same day shipping/No C.O.D. orders outside U.S.

VISA
MasterCard

PLEASE NOTE: Free shipping & handling on all orders • C.O.D. add $3.00 to total order • All orders must be paid in U.S. funds.

DISCOUNT SOFTWARE and FREE Leroy's Cheatsheet

We carry a complete line of software at competitive prices. **PLUS** - on any software package of **$25.00** or more you get a *FREE* **Leroy's Cheatsheet** of your choice! See below for shipping information.

COMMODORE 64

ABACUS
- Basic Compiler 64 $ 30
- Cad Pac 64 $ 30
- Chart Pak 64 $ 30
- Cobol 64 $ 30

ACCESS
- Leader Board Golf $ 30
- Tournament Disk 1 $ 15
- Exec Tournament 1 $ 15
- Triple Pack $ 15

ARTWORKS
- Strip Poker $ 22
- Data Disks (each) $ 16

BERKELY SOFTWORKS
- GEOS $ 42
- Deskpack 1 $ 25
- Fontpack 1 $ 22
- GeoCalc $ 36
- GeoFile $ 36
- GeoDex $ 28
- Writer's Workshop $ 36

BOOKS ON GEOS

Abacus
- Geos inside & out $ 19

Midnight Press
- How to get the most out of GEOS $ 14
- Disk for book $ 9

BATTERIES INCLUDED
- Consultant $ 44
- Paperclip/Spell Pak $ 33

BRODERBUND
- Carman Sandiego $ 26
- Print Shop $ 29
- Print Shop Comp $ 26
- Grphc Libraries *ea.* $ 18

CSM
- 1541 Alignment Kit $ 33

DIGITAL SOLUTIONS
- Pocker Filer $ 30
- Pocket Planner $ 30
- Pocket Writer $ 30

ELECTRONIC ARTS
- Marble Madness $ 26
- Make your own Murder Party $ 25

EPYX
- Fast Load (cart) $ 30
- Multiplan $ 44
- World Games $ 30

FIREBIRD
- Elite $ 22
- Pawn $ 32

INFOCOM
- Lthr Goddesses $ 26

MICROPROSE
- Gunship $ 26
- F-15 Strike Eagle $ 26
- Silent Service $ 26

PRECISION
- Superbase 64 $ 54
- Superscript 64 $ 54

PROFESSIONAL
- Fleet System 2 $ 38
- Fleet Filer $ 30

SIMON & SCHUSTER
- Chem. Lab $ 30
- Paper Airplane Kit $ 22

SPRINGBOARD
- Newsroom $ 37
- Clip Art Vol 1 $ 22
- Certificate Maker $ 37
- Certificate Library v.1 $ 25

SUBLOGIC
- Football $ 30
- Flight Simulator II $ 36
- Jet $ 30
- Scenery disks *(each)* $ 16

TIMEWORKS
- Data Manager 2 $ 30
- SwiftCalc w/Sideways $ 30
- Sylvia Porter Fin Plnr $ 37
- Word Writer w/Speller $ 37

Don't forget to select your *FREE* Leroy's Cheatsheet when ordering a program of $25 or more.

COMMODORE 128

ABACUS
- Basic 7.0 Compiler $ 44
- Cad Pac 128 $ 44
- Chart Pak 128 $ 30
- Super C $ 44
- Super Pascal 128 $ 44

BATTERIES INCLUDED
- Consultant $ 44
- Paperclip II $ 59

EPYX
- Multiplan 128 $ 44

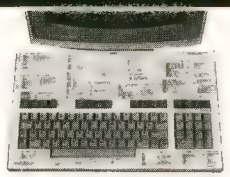
PERSONAL CHOICE
- I am The C128 $ 27

PROGRESSIVE
- Bob's Term Pro $ 59
- Superbase 128 $ 66
- Superscript128 $ 54
- Vizastar $ 64
- Vizawrite $ 64

PROFESSIONAL
- Fleet System 4 $ 51
- Fleet Filer $ 30

TIMEWORKS
- Data Manager 128 $ 50
- Partner 128 $ 50
- Swiftcalc 128 $ 50
- Word Writer 128 $ 50

LEROY'S CHEATSHEET
Keyboard Overlays



$7.95 each

PLASTIC LAMINATED

For your **COMMODORE 128**

$3.95 each

For your **COMMODORE 64**

Put Your Computer's Commands Where They Belong - And Your Manuals On The Shelf.

Have you ever sat at your computer with the manual in your lap trying to find an elusive command? How much time have you lost searching through manuals to refresh your memory on how to do what you wanted? Now you have a way to end that frustration - **Leroy's Cheatsheets**.

Leroy's Cheatsheets help you get into your program right away. We put the commands right at your fingertips, actual keystrokes are in **bold** type, variables are shown in *italics*. Designed by software experts, our durable plastic laminated overlays are comprehensive reference aids which document a product or system completely. Now use your software more easily and more effectively. With Leroy's Cheatsheets you'll never have to hunt for a program command again!!!

See below for ordering information

only $7.95 each

Plus Shipping

LEROY'S HELPBOOK FOR ELITE

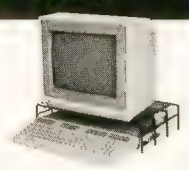
By David Palmer - The first person in the U.S to attain ELITE status. Filled with hints & tips to sharpen your combat and traiding skills. Covers approaching space station, goods to trade on what planets, quickest way to become ELITE and prepares you for FIREBIRD'S ELITE TOURNAMENT.

The Problem Solver

EQUIPMENT STAND

By Leroy

only ***$ 19.95***



Made of **sturdy vinyl coated steel** - strong enough for any computer equipment. This equipment stand will help you **organize your system**. With this unique open construction, cables are never in the wrong place, switches are more accessable and your equipment **stays cooler**. The Problem Solver Equipment stand was **specially designed** for Commodore computers 128 & 64. Keeps your monitor at eye level (Great for **printers** too).

See below for ordering information

Order Now and Save ... Money, Time and Frustration

COMMODORE 128 *$7.95 ea*

Please send me the following **LEROY'S CHEATSHEETS** for the COMMODORE 128 for only $7.95 each plus shipping.

DIE - CUT

- ☐ Basic 7.0
- ☐ Blanks (NOT laminated)
- ☐ Data Manager 128
- ☐ Disk 1571
- ☐ Easy Script
- ☐ Elite
- ☐ Fleet System 2 & 3
- ☐ Flight Simulator 2
- ☐ For The Beginner
- NEW ☐ GEOS
- ☐ Multiplan 128
- NEW ☐ Newsroom
- NEW ☐ Paperback Filer
- NEW ☐ Paperback Planner
- ☐ Paperback Writer
- ☐ Paperclip //
- ☐ Superbase 128
- ☐ Superscript 128
- NEW ☐ SwiftCalc 128
- ☐ Word Writer 128

FREE **- Keyboard extender** (each order)

COMMODORE 64 *$3.95 ea*

Please send me the following **LEROY'S CHEATSHEETS** for the COMMODORE 64 for only $3.95 each plus shipping

CUT-OUT-YOURSELF ON DOTTED LINES

- ☐ Basic 2.0
- ☐ Blanks (NOT laminated)
- ☐ Data Manager
- NEW ☐ Data Manager 2
- ☐ Disk 1541
- ☐ Easyscript
- ☐ Elite
- ☐ FleetSystem 2
- ☐ Flight Simulator 2
- ☐ For The Beginner
- ☐ GEOS
- ☐ Multiplan
- ☐ Newsroom
- ☐ Paperback Filer
- ☐ Paperback Planner
- ☐ Paperback Writer
- ☐ PaperClip
- ☐ Speedscript
- ☐ Superbase 64
- ☐ Superscript 64
- NEW ☐ SwiftCalc
- ☐ Word Writer

Also fits the COMMODORE 64C

☐ ____**Equipment stand(s)** for only ***$7.95*** each

☐ ____**ELITE HELPBOOK** for only **$7.95** each

☐ Program name(s)_____

Name _____

Address _____

City _____ State ____ Zip

ORDERING INFORMATION: For fast delivery send cashier's check or money order. Personal & company checks allow 2 weeks to clear. Master Card and Visa orders please include card #, expiration date .Prices and availability subject to change without notice.

SHIPPING:

TOTAL ORDER	Cont. U.S.	APO FPO,AK HI,CAN,PR	INTER-NATIONAL
UP to $10	$2.00	$2.00	$5.00
$10 - $25	$3.00	$4.00	$7.00
$25 - $50	$4.00	$5.00	$9.00
$50 UP	$5.00	$6.00	$15.00

TAXES: Add 6% sales (include shipping) for PA residents only

GAZ5

HOURS 8 AM - 5 PM EST Monday thru Friday U.S FUNDS ONLY NO C.O.D

CHEATSHEET PRODUCTS, INC. **P.O. Box 111368 Pittsburgh, PA. 15238**

For Orders only **TOLL *FREE*** 1-800-334-2896 PA Orders - (412) 781-1551 **DEALER INQUIRES WELCOME**

Free Spirit Software, Inc.

538 S. Edgewood
La Grange, IL 60525
(312) 352-7323

1541/1571 DRIVE ALIGNMENT

Avoid costly repair bills! Perform your own alignment. 1541/1571 Drive Alignment diagnoses and reports the alignment condition of the disk drive as you perform adjustments. An on-screen HELP menu is available while the program is running. Full documentation includes section on how to load Alignment program even when the drive is badly misaligned. Auto-boots to all modes. Works on 1541, 1571 in 1541 or 1571 mode, C64 or C128 in 64 or 128 mode. Only $34.95!

SUPER DISK LIBRARIAN

A full featured disk cataloging and library system for the C128 in 128 mode. With one keypress all programs on a disk are cataloged. Catalog up to 1000 disks and 15,200 program names! Operates in fast mode with 80 column display. Catalogs 1541, 1571 and CP/M Plus formatted disk directories. Reads heavily protected disks! Printer output includes library index, full library report, master program list, category program list and disk labels. Also contains full featured disk utilities section including all CBM DOS commands plus rename a disk, copy protect a disk, change disk format without affecting data & much more! Fully documented. Organize your disk library & more for only $29.95!

MUSIC OF THE MASTERS

Free Spirit's highly acclaimed Music of the Masters series is a must for all music lovers. An hour of classical music per disk for the C64 or the C128 in 64 mode.

Music of the Masters I - Handel, Haydn, Mozart, Bach, Beethoven & many others!

Music of the Masters II - Minuets, waltzes, sonatinas & more from Bach, Brahms, Beethoven, Chopin, Schubert & many others.

Music of the Masters III - Mostly Mozart.

Music of the Masters IV - Best of Bach.

Music of the Masters V - Popular themes from the greatest & best known works of the Masters. $9.95 per disk, 2 for $17.95, 3 for $24.95, 4 for $31.95, order all 5 disks for only $38.95!

The Great War - WWI strategy game for the C128 in 128 mode and 1571 disk drive. **Armies** of 17 countries represented. Hundreds of hours of challenge. Disk - $29.95

BASICally Simple 64 - How to use all basic 2.0 commands in Basic programs. Disk - $14.95

BASICally Simple 128 - How to use all Basic 7.0 commands in Basic programs. Disk - $19.95

Programmer's Notebook - High speed storage & retrieval system designed specifically for the programmer. Index magazine articles, programming routines or other computer related information. For the C128 in 128 mode. Disk - $19.95

Mr. Quizzer - Program to prepare quizzes as a general aid to learning. Prepare multiple choice, vocabulary, spelling, T-F, or general question-answer tests. Works on C64, C128 in either 64 or 128 mode, 40 or 80 column display, 1541 or 1571 disk drive, Commodore & compatible printers. Disk - $19.95

Free shipping & handling! Immediate delivery! Illinois residents add 8% sales tax. Send check or money order to:

Free Spirit Software, Inc.
538 S. Edgewood
La Grange, IL 60525

COMPUTER CENTERS OF AMERICA'S

WHERE THE PRICE IS RIGHT!

VISA NO EXTRA CHARGE FOR THESE CARDS MasterCard

FOR ORDERS ONLY OUT OF STATE CALL
1-800-631-1003

IN N.Y. STATE CALL TOLL FREE
1-800-221-2760

commodore

128	$249.95
1571	$229.95
C64C	$169.95
C1541C	$179.95
1670 Modem	$109.95
C1902 RGB Monitor	$259.95

GEOS™

GRAPHIC ENVIRONMENT OPERATING SYSTEM

• 5 DIFFERENT FONTS • DESK TOP • GEO PAINT • GEO WRITE • DESK ACCESSORIES

NEW FONT - PACK
DESK - PACK
FOR THE COMMODORE 64
CALL FOR PRICE

INTERFACES

P.P.I.	$34.95
XETEC JR	$39.95
XETEC SR	$59.95
M.W. 350 10K BUFFER	69.95

NEW! NEW!

brother.

PRINTERS.

FOR COMMODORE & APPLE

M1009 $129.95
■ 100 CPS 20 NLQ

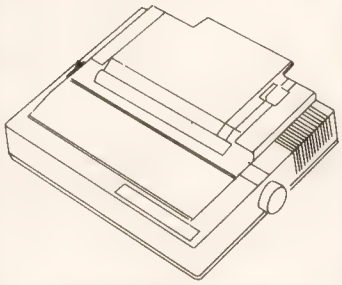
M1509 $349.95
■ 180 CPS 45 NLQ

M1709 $479.95
■ 240 CPS 50 NLQ

star micronics

NX10 PRINTER

☐ 120 CPS Dot Matrix
☐ 5K Buffer



$179.95*

*Only one per customer with purchase of two ribbons while supplies last.

star micronics

NX10C
☐ 120 CPS
☐ 30 CPS NEAR LETTER QUALITY
☐ BUILT-IN COMMODORE INTERFACE
$205.95

NP10
☐ 100 CPS
☐ 20 CPS NEAR LETTER QUALITY
$159.95

NX15
☐ 120 CPS
☐ 30 CPS NEAR LETTER QUALITY
☐ 15° CARRIAGE
$339.95

SG10C
☐ 120 CPS
☐ 30 CPS NEAR LETTER QUALITY
☐ COMMODORE READY $179.95

Powertype
18 CPS
Daisywheel Printer $199.95

NEW! SEIKOSHA

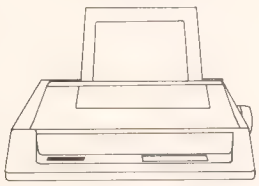
SP180 CALL FOR PRICE
☐ BUILT-IN COMMODORE INTERFACE
☐ 100 CPS 20 NLQ
☐ 2 YR WARRANTY

MP-1300AI
☐ HIGH SPEED PRINTING WITH MINIMUM NOISE
☐ BUILT-IN 10 K BUFFER
☐ EASY TO HANDLE OPTIONAL 7-COLOR PRINTING KIT
$399.95

SL-80AI
☐ FINE LETTER QUALITY PRINTING BY 24 PINS
☐ LETTER QUALITY PRINTING SPEED 54 CPS
☐ FEATURING EPSON LQ® & IBM® MODE
☐ BUILT-IN 16 K BUFFER
$324.95

SP1200AI PARALLEL PRINTER

FOR COMMODORE, ATARI & IBM



☐ 120 CPS
☐ 35 CPS NEAR LETTER QUALITY
☐ 5K Buffer $199.95

SP-1000

- Built-in Commodore Interface
- 2-Year Warranty
- Near Letter Quality Mode

SEIKOSHA
$149*

*With purchase of two ribbons.

FOR ORDERS ONLY
IN N.Y. STATE CALL TOLL FREE
1-800-221-2760
OUT OF STATE CALL
1-800-631-1003
FOR ALL OTHER INFO **516-349-1020**

COMPUTER CENTERS OF AMERICA
81 TERMINAL DRIVE
PLAINVIEW, NY 11803

Check, Money Order, MC or VISA accepted. No additional charge for MasterCard and Visa. Call for shipping and handling information / NYS residents add applicable sales tax / Prices and availability are subject to change without notice / All factory fresh merchandise with manufacturer's warranty. Dealers Welcome.

ALL SALES FINAL DEFECTIVE MERCHANDISE CAN BE EXCHANGED FOR SIMILAR ITEM

UNLEASH THE DATA ACQUISITION AND CONTROL POWER OF YOUR COMMODORE C64 OR C128.

***We have the answers* to all your control needs.**

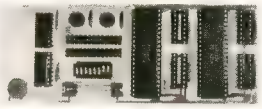
NEW! 80-LINE SIMPLIFIED DIGITAL I/O BOARD

- 40 separate buffered digital output lines can each directly switch 50 volts at 500 mA.
- 40 separate digital input lines. (TTL).
- Socket for standard ROM cartridge. Create your own autostart dedicated controller without relying on disk drive.
- I/O lines controlled through simple memory mapped ports each accessed via a single statement in Basic. No interface could be easier to use. A total of ten 8-bit ports.
- Included M.L. driver program optionally called as a subroutine for fast convenient access to individual I/O lines from Basic.
- Plugs into computer's expansion port. For both C64 & C128. I/O connections are through a pair of 50-pin professional type strip headers.

Order Model SS100 Plus. Only $119! Shipping paid USA. Includes extensive documentation and program disk. Each additional board $109.

We take pride in our interface board documentation and software support, which is available separately for examination. Credit against first order. SS100 Plus, $20. 64IF22 & ADCO816, $30.

OUR ORIGINAL ULTIMATE INTERFACE



- Universally applicable dual 6522 Versatile Interface Adapter (VIA) board.
- Industrial control and monitoring. Great for laboratory data acquisition and instrumentation applications.
- Intelligently control almost any device.
- Perform automated testing.
- Easy to program yet extremely powerful.
- Easily interfaced to high-performance A/D and D/A converters.
- Four 8-bit fully bidirectional I/O ports & eight handshake lines. Four 16-bit timer/counters. Full IRQ interrupt capability. Expandable to four boards.

Order Model 64IF22. $169 postpaid USA. Includes extensive documentation and programs on disk. Each additional board $149. Quantity pricing available. For both C64 and C128.

A/D CONVERSION MODULE

Fast. 16-channel. 8-bit. Requires above. Leaves all VIA ports available. For both C64 and C128. Order Model 64IF/ADCO816. Only $69.

SERIOUS ABOUT PROGRAMMING?

SYMBOL MASTER MULTI-PASS SYMBOLIC DISASSEMBLER. Learn to program like the experts! Adapt existing programs to your needs! Disassembles any 6502/6510/undoc/65C02/8502 machine code program into beautiful source. Outputs source code files to disk fully compatible with your MAE, PAL, CBM, Develop-64, LADS, Merlin or Panther assembler, ready for re-assembly and editing. Includes both C64 & C128 native mode versions. 100% machine code and extremely fast. 63-page manual. The original and best is now even better with Version 2.0! Advanced and sophisticated features far too numerous to detail here. $49.95 postpaid USA.

C64 SOURCE CODE. Most complete available reconstructed, extensively commented and cross-referenced assembly language source code for Basic and Kernal ROMs, all 16K. In book form, 242 pages. $29.95 postpaid USA.

PTD-6510 SYMBOLIC DEBUGGER for C64. An extremely powerful tool with capabilities far beyond a machine-language monitor. 100-page manual. Essential for assembly-language programmers. $49.95 postpaid USA.

MAE64 version 5.0. Fully professional 6502/65C02 macro editor/assembler. 80-page manual. $29.95 postpaid USA.

SCHNEDLER SYSTEMS

1501 N. Ivanhoe, Dept. G5, Arlington, VA 22205
Telephone Orders/Information (703) 237-4796

COMMODORE 64 SOFTWARE ONLY $5.00/DISK

- ☐ 001 LUSCHER COLOR TEST
- ☐ 011 DISK FILE UTILITIES
- ☐ 027 MUSIC AND SOUND
- ☐ 035 BEST OF TPUG #1
- ☐ 065 BEST OF COMMUNICATION
- ☐ 066 BEST OF UTILITIES
- ☐ 067 BEST OF GAMES
- ☐ 068 BEST OF EDUCATION
- ☐ 085 C64 SPACE GAMES
- ☐ 091 ADVENTURE
- ☐ 096 NEW STUFF
- ☐ 102 BEST GAMES OF ENGLAND
- ☐ 105 ARTIST SKETCHBOOK
- ☐ 106 GREAT AMERICAN NOVELISTS
- ☐ 107 PHONE CONNECTIONS
- ☐ 108 SPACE WARS
- ☐ 109 DUNGEONS & DRAGONS
- ☐ 110 HOME ORCHESTRA
- ☐ 111 JUKE BOX
- ☐ 112 EINSTEIN'S FAVORITES
- ☐ 113 PONZO'S TUTOR
- ☐ 114 ELECTRONIC SECRETARY

Add $4 shipping and handling per order.
CA residents add 6.5% sales tax
For free brochure of over 100 disks
Call toll free **800-431-6249** In CA **1-800-654-7955**

Amount enclosed $_____ ☐ Check ☐ VISA ☐ MasterCard
Card No _____
Signature _____ Exp. Date _____
Phone (_____) _____
Name _____
Address _____
City _____ State _____ Zip _____

BLACKSHIP
COMPUTER SUPPLY
385 Oyster Point Blvd. #10
South San Francisco, CA 94080

DUST COVERS

★ CUSTOM MADE TO FIT
★ HEAVY 32-oz. VINYL ANTI-STATIC
★ EXTENDS EQUIPMENT LIFE
★ Choice of Colors Light Tan or Brown

COMPUTERS	
C-64; Plus 4	8.00
C-128	13.00
Datassette (C2N)	5.00
Amiga 1000	13.00
(W/Amiga Mon. Stacked)	28.00
Keyboard only	7.00
Atari 800XL, 130XE	10.00
Atari 520 ST	14.00
IBM PC 'XT	28.00
IBM 5051 Keyboard	8.00
(Dimensions Required for IBM Clones)	
DISK DRIVES	
C-1541, C-1571	8.00
Amiga 3½" D Drv	8.00
Amiga 5¼" D Drv	9.00
Indust GT, MSD SD-1	8.00
MSD SD-2	10.00
Enhancer 2000	8.00
FSD-1	8.00
Atari 1050	8.00
VIDEO RECORDERS	13.00
State Make & Model Include Dimensions	
PRINTERS	
C-1525/MPS 801	10.00
C-1526 MPS 802	13.00

PRINTERS	
C-MPS 803, C-1520	8.00
Panasonic 1090 91	13.00
Gemini 10 & Star 10's	13.00
Gemini 15 & Star 15's	16.00
Okidata 92	13.00
Okidata 120/192	13.00
Okimate 10/20	8.00
Epson MX/FX/RX80	13.00
Epson LX80/C-1000	13.00
Seikosha SP-1000	13.00
Comrex 220	13.00
C'Itoh 7500	13.00
Citizen MSP 10	13.00
Atari 1027	13.00
C DPS 1101	16.00
MONITORS	
Atari SC 1224 RGB	19.00
C-1702, BMC Color	16.00
C-1902 Amiga	19.00
Amdek 500-700	19.00
Teknika MJ 10/22	19.00
CM-141 (C-1802)	19.00
Gold Star 13" Color	19.00
Thompson CM 365-66	19.00
C-1902A Magnvx 40	19.00
Magnavox 80	19.00
NEC 1225	19.00
Taxan 220	19.00
Sakata SC-100	19.00
Zenitth 122/123	19.00
Zenith 131/133	23.00

Order by stating MAKE, MODEL and COLOR CHOICE TAN or BROWN with check or money order plus $1.50 per item ($4.50 max.) shipping and handling (Foreign air extra) Calif. Res. Include 6.5% State Tax.

SPECIAL COVERS WILL BE MADE TO YOUR DIMENSIONS. SEND YOUR REQUIREMENTS FOR OUR LOW PRICE QUOTES.

Crown Custom Covers
24621 PAIGE CIRCLE, DEPT. A
LAGUNA HILLS, CA 92653
(714) 472-6362

Can Your Computer Make **YOU** a **MILLIONAIRE?**

LOTTERY 64 • LOTTERY +4

It costs no more to buy a WINNING lottery ticket!

LOTTERY was designed to use the raw power of your computer to help you play the various lottery games: LOTTO, PICK 3, PICK 4, LUCKY LOTTERY, 6/49, SUPER LOTTO, etc. We do not believe there is a better system than the "original" LOTTERY 64 & LOTTERY +4.

Join the growing list of winners

SPECIFY 64/128 or PLUS/4

To order, send $24.95 for each plus $3.00 postage and handling per order to (Illinois residents add 6% sales tax)

C.O.D. orders call (312) 566-4647

Superior Micro Systems, Inc.
P.O. Box 713 • Wheeling IL 60090
Dealer inquiries welcome!

COMPUTE!'s GAZETTE Author's Guide

Here are some suggestions which serve to improve the speed and accuracy of publication for prospective authors. COMPUTE!'s GAZETTE is primarily interested in new and timely articles on the Commodore 128, 64, Plus/4, and 16. We are much more concerned with the content of an article than with its style, but articles should as be clear and well-explained as possible.

The guidelines below will permit your good ideas and programs to be more easily edited and published:

1. The upper left corner of the first page should contain your name, address, telephone number, and the date of submission.

2. The following information should appear in the upper right corner of the first page. If your article is specifically directed to one model of computer, please state the model name. In addition, *please indicate the memory requirements of programs.*

3. The underlined title of the article should start about 2/3 of the way down the first page.

4. Following pages should be typed normally, except that in the upper right corner there should be an abbreviation of the title, your last name, and the page number. For example: Memory Map/Smith/2.

5. All lines within the text of the article must be double- or triple-spaced. A one-inch margin should be left at the right, left, top, and bottom of each page. No words should be divided at the ends of lines. And please do not justify. Leave the lines ragged.

6. Standard typing or computer paper should be used (no erasable, onionskin, or other thin paper) and typing should be on one side of the paper only (upper- and lowercase).

7. Sheets should be attached together with a paper clip. Staples should not be used.

8. If you are submitting more than one article, send each one in a separate mailer with its own tape or disk.

9. Short programs (under 20 lines) can easily be included within the text. Longer programs should be separate listings. *It is essential that we have a copy of the program, recorded twice, on a tape or disk.* If your article was written with a word processor, we also appreciate a copy of the text file on the tape or disk. Please use high-quality 10 or 30 minute tapes with the program recorded on both sides. The tape or disk should be labeled with the author's name and the title of the article. Tapes are fairly sturdy, but disks need to be enclosed within plastic or cardboard mailers (available at photography, stationery, or computer supply stores).

10. A good general rule is to spell out the numbers zero through ten in your article and write higher numbers as numerals (1024). The exceptions to this are: Figure 5, Table 3, TAB(4), etc. Within ordinary text, however, the zero through ten should appear as words, not numbers. Also, symbols and abbreviations should not be used within text: use "and" (not &), "reference" (not ref.), "through" (not thru).

11. For greater clarity, use all capitals when referring to keys (RETURN, CTRL, SHIFT), BASIC words (LIST, RND, GOTO), and the language BASIC. Headlines and subheads should, however, be initial caps only, and emphasized words are not capitalized. If you wish to emphasize, underline the word and it will be italicized during typesetting.

12. Articles can be of any length—from a single-line routine to a multi-issue series. The average article is about four to eight double-spaced, typed pages.

13. If you want to include photographs, they should be either 5×7 black and white glossies or color slides.

14. We do not consider articles which are submitted simultaneously to other publishers. If you wish to send an article to another magazine for consideration, please do not submit it to us.

15. COMPUTE!'s GAZETTE pays between $70 and $800 for published articles. In general, the rate reflects the length and quality of the article. Payment is made upon acceptance. Following submission (Editorial Department, COMPUTE!'s GAZETTE, P.O. Box 5406, Greensboro, NC 27403) it will take from two to four weeks for us to reply. If your work is accepted, you will be notified by a letter which will include a contract for you to sign and return. *Rejected manuscripts are returned to authors who enclose a self-addressed, stamped envelope.*

16. If your article is accepted and you have since made improvements to the program, please submit an entirely new tape or disk and a new copy of the article reflecting the update. We cannot easily make revisions to programs and articles. It is necessary that you send the revised version as if it were a new submission entirely, but be sure to indicate that your submission is a revised version by writing, "Revision" on the envelope and the article.

17. COMPUTE!'s GAZETTE does not accept unsolicited product reviews. If you are interested in serving on our panel of reviewers, contact our Features Editor for details.

How To Type In *COMPUTE!'s GAZETTE* Programs

Each month, COMPUTE!'s GAZETTE publishes programs for the Commodore 128, 64, Plus/4, 16, and VIC-20. Each program is clearly marked by title and version. Be sure to type in the correct version for your machine. All 64 programs run on the 128 in 64 mode. Be sure to read the instructions in the corresponding article. This can save time and eliminate any questions which might arise after you begin typing.

We frequently publish two programs designed to make typing easier: The Automatic Proofreader, and MLX, designed for entering machine language programs.

When entering a BASIC program, be especially careful with DATA statements as they are extremely sensitive to errors. A mistyped number in a DATA statement can cause your machine to "lock up" (you'll have no control over the computer). If this happens, the only recourse is to turn your computer off then back on, erasing whatever was in memory. So be sure to *save a copy of your program before you run it.* If your computer crashes, you can always reload the program and look for the error.

Special Characters

Most of the programs listed in each issue contain special control characters. To facilitate typing in any programs from the GAZETTE, use the following listing conventions.

The most common type of control characters in our listings appear as words within braces: {DOWN} means to press the cursor down key; {5 SPACES} means to press the space bar five times.

To indicate that a key should be *shifted* (hold down the SHIFT key while pressing another key), the character is underlined. For example, A means hold down the SHIFT key and press A. You may see strange characters on your screen, but that's to be expected. If you find a number followed by an underlined key enclosed in braces (for example, {8 A}), type the key as many times as indicated (in our example, enter eight SHIFTed A's).

If a key is enclosed in special brackets, [ ], hold down the Commodore key (at the lower left corner of the keyboard) and press the indicated character.

Rarely, you'll see a single letter of the alphabet enclosed in braces. This can be entered on the Commodore 64 by pressing the CTRL key while typing the letter in braces. For example, {A} means to press CTRL-A.

The Quote Mode

Although you can move the cursor around the screen with the CRSR keys, often a programmer will want to move the cursor under program control. This is seen in examples such as {LEFT} and {HOME} in the program listings. The only way the computer can tell the difference between direct and programmed cursor control is *the quote mode.*

Once you press the quote key, you're in quote mode. This mode can be confusing if you mistype a character and cursor left to change it. You'll see a reverse video character (a graphics symbol for cursor left). In this case, you can use the DELete key to back up and edit the line. Type another quote and you're out of quote mode. If things really get confusing, you can exit quote mode simply by pressing RETURN. Then just cursor up to the mistyped line and fix it.

When You Read:	Press:	See:
{CLR}	SHIFT + CLR/HOME	
{HOME}	CLR/HOME	
{UP}	SHIFT + ↑ CRSR ↓	
{DOWN}	↑ CRSR ↓	
{LEFT}	SHIFT + ← CRSR →	
{RIGHT}	← CRSR →	
{RVS}	CTRL + 9	
{OFF}	CTRL + 0	
{BLK}	CTRL + 1	
{WHT}	CTRL + 2	
{RED}	CTRL + 3	
{CYN}	CTRL + 4	

When You Read:	Press:	See:
{PUR}	CTRL + 5	
{GRN}	CTRL + 6	
{BLU}	CTRL + 7	
{YEL}	CTRL + 8	
{ F1 }	f1	
{ F2 }	SHIFT + f1	
{ F3 }	f3	
{ F4 }	SHIFT + f3	
{ F5 }	f5	
{ F6 }	SHIFT + f5	
{ F7 }	f7	
{ F8 }	SHIFT + f7	

When You Read:	Press:	See:
←	←	
SHIFT ↑	SHIFT + ↑	

For Commodore 64 Only

[1]	COMMODORE + 1	
[2]	COMMODORE + 2	
[3]	COMMODORE + 3	
[4]	COMMODORE + 4	
[5]	COMMODORE + 5	
[6]	COMMODORE + 6	
[7]	COMMODORE + 7	
[8]	COMMODORE + 8	

The Automatic Proofreader

Philip I. Nelson, Assistant Editor

"The Automatic Proofreader" helps you type in program listings for the 128, 64, Plus/4, 16, and VIC-20 and prevents nearly every kind of typing mistake.

Type in the Proofreader *exactly* as listed. Since the program can't check itself, type carefully to avoid mistakes. Don't omit any lines, even if they contain unfamiliar commands. After finishing, save a copy or two on disk or tape before running it. This is important because the Proofreader erases the BASIC portion of itself when you run it, leaving only the machine language portion in memory.

Next, type RUN and press RETURN. After announcing which computer it's running on, the Proofreader displays the message "Proofreader Active". Now you're ready to type in a BASIC program.

Every time you finish typing a line and press RETURN, the Proofreader displays a two-letter checksum in the upper-left corner of the screen. Compare this result with the two-letter checksum printed to the left of the line in the program listing. If the letters match, it's almost certain the line was typed correctly. If the letters don't match, check for your mistake and correct the line.

The Proofreader ignores spaces not enclosed in quotes, so you can omit or add spaces between keywords and still see a matching checksum. However, since spaces inside quotes are almost always significant, the Proofreader pays attention to them. For example, **10 PRINT"THIS IS BASIC"** will generate a different checksum than **10 PRINT"THIS ISBA SIC"**.

A common typing error is transposition—typing two successive characters in the wrong order, like PIRNT instead of PRINT or 64378 instead of 64738. The Proofreader is sensitive to the *position* of each character within the line and thus catches transposition errors.

The Proofreader does *not* accept keyword abbreviations (for example, ? instead of PRINT). If you prefer to use abbreviations, you can still check the line by LISTing it after typing it in, moving the cursor back to the line, and pressing RETURN. LISTing the line substitutes the full keyword for the abbreviation and allows the Proofreader to work properly. The same technique works for rechecking programs you've already typed in.

If you're using the Proofreader on the Commodore 128, Plus/4, or 16, *do not perform any GRAPHIC commands while the Proofreader is active.* When you perform a command like GRAPHIC 1, the computer moves everything at the start of BASIC program space—including the Proofreader—to another memory area, causing the Proofreader to crash. The same thing happens if you *run* any program with a GRAPHIC command while the Proofreader is in memory.

Though the Proofreader doesn't interfere with other BASIC operations, it's a good idea to disable it before running another program. However, the Proofreader is purposely difficult to dislodge: It's not affected by tape or disk operations, or by pressing RUN/STOP– RESTORE. The simplest way to disable it is to turn the computer off then on. A gentler method is to SYS to the computer's built-in reset routine (SYS 65341 for the 128, 64738 for the 64, 65526 for the Plus/4 and 16, and 64802 for the VIC). These reset routines erase any program in memory, so be sure to save the program you're typing in before entering the SYS command.

If you own a Commodore 64, you may already have wondered whether the Proofreader works with other programming utilities like "MetaBASIC." The answer is generally yes, *if you're using a 64 and activate the Proofreader after installing the other utility.* For example, first load and activate MetaBASIC, then load and run the Proofreader.

When using the Proofreader with another utility, you should disable *both* programs before running a BASIC program. While the Proofreader seems unaffected by most utilities, there's no way to promise that it will work with any and every combination of utilities you might want to use. The more utilities activated, the more fragile the system becomes.

The New Automatic Proofreader

```
10 VEC=PEEK(772)+256*PEEK(773)
   :LO=43:HI=44
20 PRINT "AUTOMATIC PROOFREADE
   R FOR ";:IF VEC=42364 THEN
   {SPACE}PRINT "C-64"
30 IF VEC=50556 THEN PRINT "VI
   C-20"
40 IF VEC=35158 THEN GRAPHIC C
   LR:PRINT "PLUS/4 & 16"
50 IF VEC=17165 THEN LO=45:HI=
   46:GRAPHIC CLR:PRINT"128"
60 SA=(PEEK(LO)+256*PEEK(HI))+
   6:ADR=SA
70 FOR J=0 TO 166:READ BYT:POK
   E ADR,BYT:ADR=ADR+1:CHK=CHK
   +BYT:NEXT
80 IF CHK<>20570 THEN PRINT "*
   ERROR* CHECK TYPING IN DATA
    STATEMENTS":END
90 FOR J=1 TO 5:READ RF,LF,HF:
   RS=SA+RF:HB=INT(RS/256):LB=
   RS-(256*HB)
100 CHK=CHK+RF+LF+HF:POKE SA+L
   F,LB:POKE SA+HF,HB:NEXT
110 IF CHK<>22054 THEN PRINT "
   *ERROR* RELOAD PROGRAM AND
   {SPACE}CHECK FINAL LINE":EN
   D
120 POKE SA+149,PEEK(772):POKE
    SA+150,PEEK(773)
130 IF VEC=17165 THEN POKE SA+
   14,22:POKE SA+18,23:POKESA+
   29,224:POKESA+139,224
140 PRINT CHR$(147);CHR$(17);"
   PROOFREADER ACTIVE":SYS SA
150 POKE HI,PEEK(HI)+1:POKE (P
   EEK(LO)+256*PEEK(HI))-1,0:N
   EW
160 DATA 120,169,73,141,4,3,16
   9,3,141,5,3
170 DATA 88,96,165,20,133,167,
   165,21,133,168,169
180 DATA 0,141,0,255,162,31,18
   1,199,157,227,3
190 DATA 202,16,248,169,19,32,
   210,255,169,18,32
200 DATA 210,255,160,0,132,180
   ,132,176,136,230,180
210 DATA 200,185,0,2,240,46,20
   1,34,208,8,72
220 DATA 165,176,73,255,133,17
   6,104,72,201,32,208
230 DATA 7,165,176,208,3,104,2
   08,226,104,166,180
240 DATA 24,165,167,121,0,2,13
   3,167,165,168,105
250 DATA 0,133,168,202,208,239
   ,240,202,165,167,69
260 DATA 168,72,41,15,168,185,
   211,3,32,210,255
270 DATA 104,74,74,74,74,168,1
   85,211,3,32,210
280 DATA 255,162,31,189,227,3,
   149,199,202,16,248
290 DATA 169,146,32,210,255,76
   ,86,137,65,66,67
300 DATA 68,69,70,71,72,74,75,
   77,80,81,82,83,88
310 DATA 13,2,7,167,31,32,151,
   116,117,151,128,129,167,136
   ,137
```

MLX Machine Language Entry Program For Commodore 64

Ottis Cowper, Technical Editor

"MLX" is a labor-saving utility that allows almost fail-safe entry of Commodore 64 machine language programs.

Type in and save some copies of MLX—you'll want to use it to enter future ML programs from COMPUTE!'s GAZETTE. When you're ready to enter an ML program, load and run MLX. It asks you for a starting address and an ending address. These addresses appear in the article accompanying the MLX-format program listing you're typing.

If you're unfamiliar with machine language, the addresses (and all other values you enter in MLX) may appear strange. Instead of the usual decimal numbers you're accustomed to, these numbers are in *hexadecimal*—a base 16 numbering system commonly used by ML programmers. Hexadecimal—hex for short—includes the numerals 0–9 and the letters A–F. But don't worry—even if you know nothing about ML or hex, you should have no trouble using MLX.

After you enter the starting and ending addresses, you'll be offered the option of clearing the workspace. Choose this option if you're starting to enter a new listing. If you're continuing a listing that's partially typed from a previous session, don't choose this option.

A functions menu will appear. The first option in the menu is ENTER DATA. If you're just starting to type in a program, pick this. Press the E key, and type the first number in the first line of the program listing. If you've already typed in part of a program, type the line number where you left off typing at the end of the previous session (be sure to load the partially completed program before you resume entry). In any case, make sure the address you enter corresponds to the address of a line in the listing you are entering. Otherwise, you'll be unable to enter the data correctly. If you pressed E by mistake, you can return to the command menu by pressing RETURN alone when asked for the address. (You can get back to the menu from most options by pressing RETURN with no other input.)

Entering A Listing

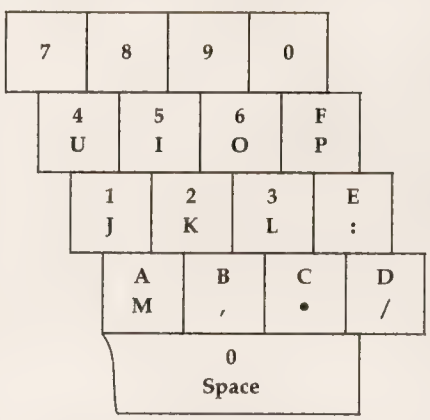
Once you're in Enter mode, MLX prints the address for each program line for you. You then type in all nine numbers on that line, beginning with the first two-digit number after the colon (:). Each line represents eight data bytes and a checksum. Although an MLX-format listing appears similar to the "hex dump" listings from a machine language monitor program, the extra checksum number on the end allows MLX to check your typing.

When you enter a line, MLX recalculates the checksum from the eight bytes and the address and compares this value to the number from the ninth column. If the values match, you'll hear a bell tone, the data will be added to the workspace area, and the prompt for the next line of data will appear. But if MLX detects a typing error, you'll hear a low buzz and see an error message. The line will then be redisplayed for editing.

Invalid Characters Banned

Only a few keys are active while you're entering data, so you may have to unlearn some habits. You *do not* type spaces between the columns; MLX automatically inserts these for you. You *do not* press RETURN after typing the last number in a line; MLX automatically enters and checks the line after you type the last digit.

Only the numerals 0–9 and the letters A–F can be typed in. If you press any other key (with some exceptions noted below), you'll hear a warning buzz. To simplify typing, the numeric keypad modification from the March 1986 "Bug-Swatter" column is now incorporated in the listing. The keypad is active only while entering data. Addresses must be entered with the normal letter and number keys. The figure below shows the keypad configuration:



MLX checks for transposed characters. If you're supposed to type in A0 and instead enter 0A, MLX will catch your mistake. There is one error that can slip past MLX: Because of the checksum formula used, MLX won't notice if you accidentally type FF in place of 00, and vice versa. And there's a very slim chance that you could garble a line and still end up with a combination of characters that adds up to the proper checksum. However, these mistakes should not occur if you take reasonable care while entering data.

Editing Features

To correct typing mistakes before finishing a line, use the INST/DEL key to delete the character to the left of the cursor. (The cursor-left key also deletes.) If you mess up a line really badly, press CLR/HOME to start the line over. The RETURN key is also active, but only before any data is typed on a line. Pressing RETURN at this point returns you to the command menu. After you type a character of data, MLX disables RETURN until the cursor returns to the start of a line. Remember, you can press CLR/HOME to quickly get to a line number prompt.

More editing features are available when correcting lines in which MLX has detected an error. To make corrections in a line that MLX has redisplayed for editing, compare the line on the screen with the one printed in the listing, then move the cursor to the mistake and type the correct key. The cursor left and right keys provide the normal cursor controls. (The INST/DEL key now works as an alternative cursor-left key.) You cannot move left beyond the first character in the line. If you try to move beyond the rightmost character, you'll reenter the line. During editing, RETURN is active; pressing it tells MLX to recheck the line. You can press the CLR/HOME key to clear the entire line if you want to start from scratch, or if you want to get to a line number prompt to use RETURN to get back to the menu.

Display Data

The second menu choice, DISPLAY DATA, examines memory and shows the contents in the same format as the program listing (including the checksum). When you press D, MLX asks you for a starting address. Be sure that the starting address you give corresponds to a line number in the listing. Otherwise, the checksum display will be meaningless. MLX displays program lines until it reaches the end of the program, at which point the menu is redis-

played. You can pause the display by pressing the space bar. (MLX finishes printing the current line before halting.) Press space again to restart the display. To break out of the display and get back to the menu before the ending address is reached, press RETURN.

Other Menu Options

Two more menu selections let you save programs and load them back into the computer. These are SAVE FILE and LOAD FILE; their operation is quite straightforward. When you press S or L, MLX asks you for the filename. You'll then be asked to press either D or T to select disk or tape.

You'll notice the disk drive starting and stopping several times during a load or save. Don't panic; this is normal behavior. MLX opens and reads from or writes to the file instead of using the usual LOAD and SAVE commands. Disk users should also note that the drive prefix 0: is automatically added to the filename (line 750), so this should *not* be included when entering the name. This also precludes the use of @ for Save-with-Replace, so remember to give each version you save a different name.

Remember that MLX saves the entire workspace area from the starting address to the ending address, so the save or load may take longer than you might expect if you've entered only a small amount of data from a long listing. When saving a partially completed listing, make sure to note the address where you stopped typing so you'll know where to resume entry when you reload.

MLX reports the standard disk or tape error messages if any problems are detected during the save or load. (Tape users should bear in mind that Commodore computers are never able to detect errors during a save to tape.) MLX also has three special load error messages: INCORRECT STARTING ADDRESS, which means the file you're trying to load does not have the starting address you specified when you ran MLX; LOAD ENDED AT *address*, which means the file you're trying to load ends before the ending address you specified when you started MLX; and TRUNCATED AT ENDING ADDRESS, which means the file you're trying to load extends beyond the ending address you specified when you started MLX. If you see one of these messages and feel certain that you've loaded the right file, exit and rerun MLX, being careful to enter the correct starting and ending addresses.

The QUIT menu option has the obvious effect—it stops MLX and enters BASIC. The RUN/STOP key is disabled, so the Q option lets you exit the program without turning off the computer. (Of course, RUN/STOP-RESTORE also gets you out.) You'll be asked for verification; press Y to exit to BASIC, or any other key to return to the menu. After quitting, you can type RUN again and reenter MLX without losing your data, as long as you don't use the clear workspace option.

The Finished Product

When you've finished typing all the data for an ML program and saved your work, you're ready to see the results. The instructions for loading and using the finished product vary from program to program. Some ML programs are designed to be loaded and run like BASIC programs, so all you need to type is LOAD *"filename"*,8 for disk or LOAD *"filename"* for tape, and then RUN. Such programs will usually have a starting address of 0801 for the 64. Other programs must be reloaded to specific addresses with a command such as LOAD *"filename"*,8,1 for disk or LOAD *"filename"*,1,1 for tape, then started with a SYS to a particular memory address. On the Commodore 64, the most common starting address for such programs is 49152, which corresponds to MLX address C000. In either case, you should always refer to the article which accompanies the ML listing for information on loading and running the program.

An Ounce Of Prevention

By the time you finish typing in the data for a long ML program, you may have several hours invested in the project. Don't take chances—use our "Automatic Proofreader" to type the new MLX, and then test your copy *thoroughly* before first using it to enter any significant amount of data. Make sure all the menu options work as they should. Enter fragments of the program starting at several different addresses, then use the Display option to verify that the data has been entered correctly. And be sure to test the Save and Load options several times to insure that you can recall your work from disk or tape. Don't let a simple typing error in the new MLX cost you several nights of hard work.

MLX For Commodore 64

```
SS 10 REM VERSION 1.1: LINES 8
      30,950 MODIFIED, LINES 4
      85-487 ADDED
EK 100 POKE 56,50:CLR:DIM IN$,
      I,J,A,B,A$,B$,A(7),N$
DM 110 C4=48:C6=16:C7=7:Z2=2:Z
      4=254:Z5=255:Z6=256:Z7=
      127
CJ 120 FA=PEEK(45)+Z6*PEEK(46)
      :BS=PEEK(55)+Z6*PEEK(56
      ):H$="0123456789ABCDEF"
SB 130 R$=CHR$(13):L$="{LEFT}"
      :S$=" ":D$=CHR$(20):Z$=
      CHR$(0):T$="{13 RIGHT}"
CQ 140 SD=54272:FOR I=SD TO SD
      +23:POKE I,0:NEXT:POKE
      {SPACE}SD+24,15:POKE 78
      8,52
FC 150 PRINT"{CLR}"CHR$(142)CH
      R$(8):POKE 53280,15:POK
      E 53281,15
EJ 160 PRINT T$" {RED}{RVS}
      {2 SPACES}[8 @]
      {2 SPACES}"SPC(28)"
      {2 SPACES}{OFF}{BLU} ML
      X II {RED}{RVS}
      {2 SPACES}"SPC(28)"
      {12 SPACES}{BLU}"
FR 170 PRINT"{3 DOWN}
      {3 SPACES}COMPUTE!'S MA
      CHINE LANGUAGE EDITOR
      {3 DOWN}"
JB 180 PRINT"{BLK}STARTING ADD
      RESS[43]";:GOSUB300:SA=A
      D:GOSUB1040:IF F THEN18
      0
GF 190 PRINT"{BLK}{2 SPACES}EN
      DING ADDRESS[43]";:GOSUB
      300:EA=AD:GOSUB1030:IF
      {SPACE}F THEN190
KR 200 INPUT"{3 DOWN}{BLK}CLEA
      R WORKSPACE [Y/N][43]";A
      $:IF LEFT$(A$,1)<>"Y"TH
      EN220
PG 210 PRINT"{2 DOWN}{BLU}WORK
      ING...";:FORI=BS TO BS+
      EA-SA+7:POKE I,0:NEXT:P
      RINT"DONE"
DR 220 PRINTTAB(10)"{2 DOWN}
      {BLK}{RVS} MLX COMMAND
      {SPACE}MENU {DOWN}[43]":
      PRINT T$"{RVS}E{OFF}NTE
      R DATA"
BD 230 PRINT T$"{RVS}D{OFF}ISP
      LAY DATA":PRINT T$"
      {RVS}L{OFF}OAD FILE"
JS 240 PRINT T$"{RVS}S{OFF}AVE
       FILE":PRINT T$"{RVS}Q
      {OFF}UIT{2 DOWN}{BLK}"
JH 250 GET A$:IF A$=N$ THEN250
HK 260 A=0:FOR I=1 TO 5:IF A$=
      MID$("EDLSQ",I,1)THEN A
      =I:I=5
FD 270 NEXT:ON A GOTO420,610,6
      90,700,280:GOSUB1060:GO
      TO250
EJ 280 PRINT"{RVS} QUIT ":INPU
      T"{DOWN}[43]ARE YOU SURE
       [Y/N]";A$:IF LEFT$(A$,
      1)<>"Y"THEN220
EM 290 POKE SD+24,0:END
JX 300 IN$=N$:AD=0:INPUTIN$:IF
      LEN(IN$)<>4THENRETURN
KF 310 B$=IN$:GOSUB320:AD=A:B$
      =MID$(IN$,3):GOSUB320:A
      D=AD*256+A:RETURN
PP 320 A=0:FOR J=1 TO 2:A$=MID
      $(B$,J,1):B=ASC(A$)-C4+
      (A$>"@")*C7:A=A*C6+B
JA 330 IF B<0 OR B>15 THEN AD=
      0:A=-1:J=2
GX 340 NEXT:RETURN
CH 350 B=INT(A/C6):PRINT MID$(
      H$,B+1,1);:B=A-B*C6:PRI
      NT MID$(H$,B+1,1);:RETU
      RN
RR 360 A=INT(AD/Z6):GOSUB350:A
      =AD-A*Z6:GOSUB350:PRINT
      ":";
BE 370 CK=INT(AD/Z6):CK=AD-Z4*
      CK+Z5*(CK>Z7):GOTO390
PX 380 CK=CK*Z2+Z5*(CK>Z7)+A
```

```
JC 390 CK=CK+Z5*(CK>Z5):RETURN
QS 400 PRINT"{DOWN}STARTING AT
       [4]";:GOSUB300:IF IN$<>
       N$ THEN GOSUB1030:IF F
       {SPACE}THEN400
EX 410 RETURN
HD 420 PRINT"{RVS} ENTER DATA
       {SPACE}":GOSUB400:IF IN
       $=N$ THEN220
JK 430 OPEN3,3:PRINT
SK 440 POKE198,0:GOSUB360:IF F
        THEN PRINT IN$:PRINT"
       {UP}{5 RIGHT}";
GC 450 FOR I=0 TO 24 STEP 3:B$
       =S$:FOR J=1 TO 2:IF F T
       HEN B$=MID$(IN$,I+J,1)
HA 460 PRINT"{RVS}"B$L$;:IF I<
       24THEN PRINT"{OFF}";
HD 470 GET A$:IF A$=N$ THEN470
FK 480 IF(A$>"/"ANDA$<":")OR(A
       $>"@"ANDA$<"G")THEN540
GS 485 A=-(A$="M")-2*(A$=",")-
       3*(A$=".")-4*(A$="/")-5
       *(A$="J")-6*(A$="K")
FX 486 A=A-7*(A$="L")-8*(A$=":
       ")-9*(A$="U")-10*(A$="I
       ")-11*(A$="O")-12*(A$="
       P")
CM 487 A=A-13*(A$=S$):IF A THE
       N A$=MID$("ABCD123E456F
       0",A,1):GOTO 540
MP 490 IF A$=R$ AND((I=0)AND(J
       =1)OR F)THEN PRINT B$;:
       J=2:NEXT:I=24:GOTO550
KC 500 IF A$="{HOME}" THEN PRI
       NT B$:J=2:NEXT:I=24:NEX
       T:F=0:GOTO440
MX 510 IF(A$="{RIGHT}")ANDF TH
       ENPRINT B$L$;:GOTO540
GK 520 IF A$<>L$ AND A$<>D$ OR
       ((I=0)AND(J=1))THEN GOS
       UB1060:GOTO470
HG 530 A$=L$+S$+L$:PRINT B$L$;
       :J=2-J:IF J THEN PRINT
       {SPACE}L$;:I=I-3
QS 540 PRINT A$;:NEXT J:PRINT
       {SPACE}S$;
PM 550 NEXT I:PRINT:PRINT"{UP}
       {5 RIGHT}";:INPUT#3,IN$
       :IF IN$=N$ THEN CLOSE3:
       GOTO220
QC 560 FOR I=1 TO 25 STEP3:B$=
       MID$(IN$,I):GOSUB320:IF
        I<25 THEN GOSUB380:A(I
       /3)=A
PK 570 NEXT:IF A<>CK THEN GOSU
       B1060:PRINT"{BLK}{RVS}
       {SPACE}ERROR: REENTER L
       INE [4]":F=1:GOTO440
HJ 580 GOSUB1080:B=BS+AD-SA:FO
       R I=0 TO 7:POKE B+I,A(I
       ):NEXT
QQ 590 AD=AD+8:IF AD>EA THEN C
       LOSE3:PRINT"{DOWN}{BLU}
       ** END OF ENTRY **{BLK}
       {2 DOWN}":GOTO700
GQ 600 F=0:GOTO440
QA 610 PRINT"{CLR}{DOWN}{RVS}
       {SPACE}DISPLAY DATA ":G
       OSUB400:IF IN$=N$ THEN2
       20
RJ 620 PRINT"{DOWN}{BLU}PRESS:
        {RVS}SPACE{OFF} TO PAU
       SE, {RVS}RETURN{OFF} TO
        BREAK[4]{DOWN}"
KS 630 GOSUB360:B=BS+AD-SA:FOR
       I=BTO B+7:A=PEEK(I):GOS
       UB350:GOSUB380:PRINT S$
       ;
CC 640 NEXT:PRINT"{RVS}";:A=CK
       :GOSUB350:PRINT
KH 650 F=1:AD=AD+8:IF AD>EA TH
       ENPRINT"{DOWN}{BLU}** E
       ND OF DATA **":GOTO220
KC 660 GET A$:IF A$=R$ THEN GO
       SUB1080:GOTO220
EQ 670 IF A$=S$ THEN F=F+1:GOS
       UB1080
AD 680 ONFGOTO630,660,630
CM 690 PRINT"{DOWN}{RVS} LOAD
       {SPACE}DATA ":OP=1:GOTO
       710
PC 700 PRINT"{DOWN}{RVS} SAVE
       {SPACE}FILE ":OP=0
RX 710 IN$=N$:INPUT"{DOWN}FILE
       NAME[4]";IN$:IF IN$=N$
       {SPACE}THEN220
PR 720 F=0:PRINT"{DOWN}{BLK}
       {RVS}T{OFF}APE OR {RVS}
       D{OFF}ISK: [4]";
FP 730 GET A$:IF A$="T"THEN PR
       INT"T{DOWN}":GOTO880
HQ 740 IF A$<>"D"THEN730
HH 750 PRINT"D{DOWN}":OPEN15,8
       ,15,"I0:":B=EA-SA:IN$="
       0:"+IN$:IF OP THEN810
SQ 760 OPEN 1,8,8,IN$+",P,W":G
       OSUB860:IF A THEN220
FJ 770 AH=INT(SA/256):AL=SA-(A
       H*256):PRINT#1,CHR$(AL)
       ;CHR$(AH);
PE 780 FOR I=0 TO B:PRINT#1,CH
       R$(PEEK(BS+I));:IF ST T
       HEN800
FC 790 NEXT:CLOSE1:CLOSE15:GOT
       O940
GS 800 GOSUB1060:PRINT"{DOWN}
       {BLK}ERROR DURING SAVE:
       [4]":GOSUB860:GOTO220
MA 810 OPEN 1,8,8,IN$+",P,R":G
       OSUB860:IF A THEN220
GE 820 GET#1,A$,B$:AD=ASC(A$+Z
       $)+256*ASC(B$+Z$):IF AD
       <>SA THEN F=1:GOTO850
RX 830 FOR I=0 TO B:GET#1,A$:P
       OKE BS+I,ASC(A$+Z$):IF(
       I<>B)AND ST THEN F=2:AD
       =I:I=B
FA 840 NEXT:IF ST<>64 THEN F=3
FQ 850 CLOSE1:CLOSE15:ON ABS(F
       >0)+1 GOTO960,970
SA 860 INPUT#15,A,A$:IF A THEN
        CLOSE1:CLOSE15:GOSUB10
       60:PRINT"{RVS}ERROR: "A
       $
GQ 870 RETURN
EJ 880 POKE183,PEEK(FA+2):POKE
       187,PEEK(FA+3):POKE188,
       PEEK(FA+4):IFOP=0THEN92
       0
HJ 890 SYS 63466:IF(PEEK(783)A
       ND1)THEN GOSUB1060:PRIN
       T"{DOWN}{RVS} FILE NOT
       {SPACE}FOUND ":GOTO690
CS 900 AD=PEEK(829)+256*PEEK(8
       30):IF AD<>SA THEN F=1:
       GOTO970
SC 910 A=PEEK(831)+256*PEEK(83
       2)-1:F=F-2*(A<EA)-3*(A>
       EA):AD=A-AD:GOTO930
KM 920 A=SA:B=EA+1:GOSUB1010:P
       OKE780,3:SYS 63338
JF 930 A=BS:B=BS+(EA-SA)+1:GOS
       UB1010:ON OP GOTO950:SY
       S 63591
AE 940 GOSUB1080:PRINT"{BLU}**
        SAVE COMPLETED **":GOT
       O220
XP 950 POKE147,0:SYS 63562:IF
       {SPACE}ST>0 THEN970
FR 960 GOSUB1080:PRINT"{BLU}**
        LOAD COMPLETED **":GOT
       O220
DP 970 GOSUB1060:PRINT"{BLK}
       {RVS}ERROR DURING LOAD:
       {DOWN}[4]":ON F GOSUB98
       0,990,1000:GOTO220
PP 980 PRINT"INCORRECT STARTIN
       G ADDRESS (";:GOSUB360:
       PRINT")":RETURN
GR 990 PRINT"LOAD ENDED AT ";:
       AD=SA+AD:GOSUB360:PRINT
       D$:RETURN
FD 1000 PRINT"TRUNCATED AT END
       ING ADDRESS":RETURN
RX 1010 AH=INT(A/256):AL=A-(AH
       *256):POKE193,AL:POKE1
       94,AH
FF 1020 AH=INT(B/256):AL=B-(AH
       *256):POKE174,AL:POKE1
       75,AH:RETURN
FX 1030 IF AD<SA OR AD>EA THEN
       1050
HA 1040 IF(AD>511 AND AD<40960
       )OR(AD>49151 AND AD<53
       248)THEN GOSUB1080:F=0
       :RETURN
HC 1050 GOSUB1060:PRINT"{RVS}
       {SPACE}INVALID ADDRESS
        {DOWN}{BLK}":F=1:RETU
       RN
AR 1060 POKE SD+5,31:POKE SD+6
       ,208:POKE SD,240:POKE
       {SPACE}SD+1,4:POKE SD+
       4,33
DX 1070 FOR S=1 TO 100:NEXT:GO
       TO1090
PF 1080 POKE SD+5,8:POKE SD+6,
       240:POKE SD,0:POKE SD+
       1,90:POKE SD+4,17
AC 1090 FOR S=1 TO 100:NEXT:PO
       KE SD+4,0:POKE SD,0:PO
       KE SD+1,0:RETURN
```


THE SOFT 64 & 128 GROUP

Presents... EXPLODE! and On Target Disk Drive Alignment Kit

EXPLODE! Add a NEW DIMENSION of POWER to your C-64, C-128*, SX -64 and the new 64-C.

EXPLODE! is a convenient to use cartridge, **EXPLODE!** will not interfere with program loading or operations. **EXPLODE!** can be left in at all times. Here is a list of features you will find in **EXPLODE!**
(1) A FASTLOAD that's 98% compatible (won't interfere with running of most programs) and over 500% faster loading
(2) A HI-RES SCREEN DUMP with FULL 8" by 11" printout in TRUE GRAY SCALE, (all 16 colors are presented as shades of gray)
(3) Allows YOU TO SAVE a HI-RES SCREEN to DISK as a PGM FILE
(4) A LOAD & RE-DISPLAY FEATURE for ALL HI-RES SCREEN FILES
(5) A RESET BUTTON, a UTILITY DISK, D.O.S wedge, TEXT dump printer, UN-NEW command, and many many other features!
(6) WORKS WITH C B.M. printers (except 1526 and 802). Will also work with EPSON & C-ITOH types and most CLONES of all the above (Please consult your manual)
ONLY **$29.95** + $1.50 S/H. COD's add $3.00 (prices are U.S. only) ILL res. add 6% sales tax (**EXPLODE!** carries a 90 day warranty)
*In 64 mode only

On Target Fast, Easy to use, Accurate and best of all Inexpensive If those words describe your idea of ALIGNMENT PACKAGE for your 1540-41 or 1571 drive then read on! **On Target** will allow you to perform accurate disk drive alignments in 30 mins. or less The concept is simple! Read the output of your disk drives head If you can see that output, you would know whether you're in the middle of a track or not ie aligned or not! **On Target** will do this for you without a computer!
Here's what you get when you buy the **On Target Alignment Kit.**
(1) A PRECISION ALIGNMENT METER
(2) A DISK with the (ALIGNMENT STANDARD) on one side and (OPTIONAL un-protected PROGRAMS) on the other side
(3) A LARGE, HEAVY 7 PAGE, fully illustrated manual, with a TIPS & HINTS page
(4) One small jumper cable and a FULL 1 YEAR WARRANTY! Two versions are available (A) For the 1540-41 only for **$25.00** or (B) for the 1540-41 and 1571 for only **$35.00** - $1.50 S/H (same rules apply here as for ordering **EXPLODE!**)

To Order: WRITE OR CALL (312) 851-6667 ANYTIME
C.O.D. & M/O's Welcomed
Personal Checks 14 Days to Clear

The Soft 64/128 Group
P.O. Box 111
Montgomery, IL. 60538

Classified

SOFTWARE

$$ WIN WITH THOROUGHBRED, Harness & Greyhound handicapping software: $29.95 Enhanced: $49.95. Pro Football Handicapping System: $39.95. For most computers. Free info. Software Exchange, Box 5382 CG, W. Bloomfield, MI 48033. Orders: (800) 527-9467

ARB BULLETIN BOARD FOR THE 64 & 128 300–1200 Baud, Punter/Xmodem/ASCII Vote, ARB NETWORK, Matchmaker, Quiz, Email, 27 SIGS, Con't Story, SOURCE CODE & More! $64.95 for 64 BBS * $79.95 for 128 BBS (BBS) 718-645-1979 * (Voice) 718-336-2343 L&S COMPUTERS, PO Box 392, Bklyn, NY 11229

COMMODORE: TRY BEFORE YOU BUY. Best selling games, utilities, educational + classics and new releases. 100's of titles. Visa/MC. Free brochure. RENT-A-DISC, Frederick Bldg. #345, Hunt'n, WV 25701 (304) 529-3232

FREE SOFTWARE for C64, C128, IBM & CPM Send SASE for info (specify computer) to: PUBLIC DOMAIN USERS GROUP PO Box 1442-A2, Orange Park, FL 32067

NEW BASIC PROGRAMMING FUN FOR C64-128 Make Funny Animated KEYBOARD CARTOONS also LIVELY Prog/Titles & Games. Learn with easy Demodisk + Instr Book **$12.95** ppd. LOCKHART DEV., POB 214, Palm City, FL 33490

ARTIFICIAL INTELLIGENCE language LISP! Lisp interpreter for C64 with 140 page manual, Source Code, Tutorial & Sample Programs. Send $39.95 to List Processing Software, Box 3422, Rapid City, SD 57709

FAMILY TREE Produces Pedigree Charts, Family Group Records, Files, Indexes, Searches. 3 versions...64, LDS, 128. $49.95 + $2 s/h. **GENEALOGY SOFTWARE**, POB 1151, PT HURON, MI 48061 (519) 542-4424

SpeedScript (c) 3.0–3.2 Info/Enhancements /WURDS/: Webster's Dictionary for SpeedCheck. 15K+words entered by frequency in Am. Eng. for speed: $17+s/h. /SPEEDMATE/:SS 3.x customizer. Set/save margin defaults, 30+ print codes. PRINT PREVIEW 80 CHARS. WIDE ON SCREEN AT ONCE, no horiz scrolling!: $17+s/h. /SPEEDPAK/: SS 3.x enhancer: Edit, cut, paste between two texts at once, help screen, mail merge, Dvorak, ASCII conv:$17+s/h. Add $3/order s/h ($6 outside US/CAN.) CALL NOW FOR FREE INFO! MC/Visa OK. (919) 379-9732. UPSTART-G75, POB 22022, Greensboro, NC 27420

VIC & C64 SOFTWARE/HARDWARE/ACCES. liquidation! 1670 (1200 baud) modems $99! VIC cartridges 6/$10! Big List $1! BASIC FUNDAMENTALS, 3362 S. 2300 E., SLC, UT 84109

B-I-N-G-O the all-time favorite game now available for the C64. Includes software printing cards. $14.95. Larry Conn, 36 Briarwood Dr., Elverson, PA 19520

New Plus/4 and C128 Software (disk only) Games, educational, finance statistics. Write for info. CARDINAL SOFTWARE, 14840 Build America Dr., Woodbridge, VA 22191

A good Genealogy Program, a Great price. For more information write to: GSC Software, P.O. Box 1148, Centerville, Utah 84014. Price is $24.95. Add $20 for source code in BASIC. (C-64 only)

C-128 SOFTWARE-NEW-VIDEX, Database for Video Tapes. Index 8 fields, Time Left Label Maker $29.95 pp./ also 64 version. Gemware, 1224 Church St., Sandpoint, ID 83864

BEST PUBLIC DOMAIN PRICES & SERVICE *PICK PROGRAMS IN OUR FREE CATALOG &* *ONLY PAY BY THE BLOCK YOUR CHOICE!* *QUAIL, POB L-2, WOODLAND, WA 98674*

WANTED: MODEM GAMES and PROGRAMS!!! original or Public Domain. Royalties or Finders Fee paid. Submit to: DISK MATE, P.O. Box 2031, Clarksburg, WV 26302

FREE DISCOUNT SOFTWARE CATALOG DISKS OF GAMES, UTILITIES, MUSIC. $5 per Disk or 4 for $15. Send for FREE CATALOG. HOMESPUN SOFTWARE, PO Box 214, Palm City, FL 33490

DIET ANALYSIS PROGRAM FOR C64 Keeps track of 25 nutrients and 8 amino acids for up to 665 different foods and drinks. Program contains nutritional information for 500 food and drink items. **CHANGE AND ADD** program lets you rename, add, remove or mix records together to fit your needs. Use these programs to count calories while checking for vitamin and mineral deficiencies or too much fat, sodium, or cholesterol. The **NUTRIENT FINDER** program will tell you which foods to add to your diet to correct your deficiencies. **MENU DRIVEN,** fast and very easy to use. 1 disk $29.95 (includes all programs, instructions & shipping.) **DIET, PO Box 649120,** Mustang, Oklahoma 73064-9001

HARDWARE

COMMODORE CUSTOM CHIPS for C64/128 @ low prices. 6510/6526-$9, 6567-$15, 6581-$11, PLA/S100-$12, others. Just out: The Commodore Diagnostician''-repair your own C64 etc...$6.95. Kasara Microsys, 33 Murray Hill Dr., Spring Valley, NY 10977 800/642-7634, 914/356-3131

COMPUTER REPAIR - C64: $45, 1541: $50 Parts available. MAJOR COMPUTER SERVICES, Rte. 6, Box 806-M, Midland, TX 79703 (915) 561-8483 V/MC/COD

MISCELLANEOUS

SX-64 OWNERS! STAND UP AND BE COUNTED! Join the USA SX-64 USERS GROUP! Monthly newsletter, discounts on products and free software. Yearly dues $15. SX-64 Pro Soft Carry Bag $75 ($65 w/membshp) + $4 s/h. Send to: USA SX-64 USERS GROUP, 10 Cornwall St., Bost, MA 02130

Use YOUR PHOTOs, Slides or Drawings with your C-64/128 PROGRAMS, REPORTS and COMPUTER ART. Images digitized (in B/W) and returned on disk. Include the name of your GRAPHICS PROGRAM. Images cropped unless full frame specified. Send copies; we cannot be responsible for loss or damage of materials. Min order-$15 for 3 images, $3 ea add image + $2 s/h (CA res add 6% tax / foreign add $4 US). Send CK/MO to: YORE PHOTO™, Dept. A, PO Box 1269, 29 Palms, CA 92277 (619)367-3779 COLOR service is available for the AMIGA.

BBS Numbers $5 BBS Software! Order by modem (300 BAUD) 818-840-8066 or send $5 to BBS-FUNPAK, Box 6055, Burbank, CA 91510 Multi-User Modem Party Line: 818-842-3322

COMPUTE!'s Gazette Classified is a low-cost way to tell over 275,000 microcomputer owners about your product or service.

Rates: $25 per line, minimum of four lines. Any or all of the first line set in capital letters at no charge. Add $15 per line for boldface words, or $50 for the entire ad set in boldface (any number of lines.) Inquire about display rates.

Terms: Prepayment is required. Check, money order, American Express, Visa, or MasterCard is accepted. Make checks payable to COMPUTE! Publications.

Form: Ads are subject to publisher's approval and must be either typed or legibly printed. One line equals 40 letters and spaces between words. Please underline words to be set in boldface.

General Information: Advertisers using post office box numbers in their ads must supply permanent address and telephone numbers. Orders will not be acknowledged. Ad will appear in next available issue after receipt.

Closing: 10th of the third month preceding cover date (e.g., June issue closes March 10th). Send order and remittance to: Harry Blair, Classified Manager, COMPUTE!'s Gazette, P.O. Box 5406, Greensboro, NC 27403. To place an ad by phone, call Harry Blair at (919) 275-9809.

Notice: COMPUTE! Publications cannot be responsible for offers or claims of advertisers, but will attempt to screen out misleading or questionable copy.

DISK LIQUIDATION!

PREMIUM QUALITY! 5 YEAR WARRANTY!

THE BIG DISKETTE MAKERS ARE PANICKING! The price cuts in the diskette market have forced top makers to sell off their inventory at pennies! These disks are not second, not cosmetic rejects, only top-of-the-line highest quality disks, available to you at a fraction of the original selling price! Guaranteed 100% error-free, money-back satisfaction guarantee, five year replacement warranty! We can't print the makers, but you'll recognize them as among the highest quality, premium disks made! All disks meet or exceed ANSI standards, 50% clipping level, 9.5 mil jackets!

from 31¢ each

5¼" DS/DD UNIVERSAL DISKETTE FOR IBM-PC/XT & COMPATIBLES, APPLE II SERIES, ATARI, TRS-80.

#4102	Box of 25 w/slvs/lbls/tabs	$10/box (40¢/disk)
#4103	Case of 100 w/slvs/lbls/tabs	$38/case (39¢/disk)
#4104	Bulk case of 100 w/lbls/tabs	$34/case (34¢/disk)
#4105	Bulk carton of 1000 w/lbls/tabs	$310/case (31¢/disk)
#UC2JA	Asst color disks 25-box w/slvs/lbls/tabs	$19.95 (79¢/disk)
#UATJ	AT Hi-density 25-box w/slvs/lbls/tabs	$42.25 ($1.69/disk)

3½" DISKS FOR THE MACINTOSH, AMIGA, IBM-PC 3½". ALL ARE COMPLETE WITH LABELS FOR NOTATIONS.

#UD3J	Single side, pack of 25	$32.25/pack ($1.29/disk)
#UD3H	Single side, pack of 100	$125/pack ($1.25/disk)
#UD6J	Double side, pack of 25	$37.25/pack ($1.49/disk)
#UD6H	Double side, pack of 100	$139/pack ($1.39/disk)

30 Day Money Back Satisfaction Guarantee

PAPER SLEEVES for 5¼" disks, 100-pak, #SLV $4.00 (4¢ each)
TYVEK SLEEVES for 5¼" disks, 100-pak, #TYV $6.00 (6¢ each)
5¼" CLEANER KIT, disks & solvent for 15 cleanings! #HCK $4.95
3½" CLEANER KIT, disks & solvent for 15 cleanings! #HCK3 $6.95
80 COL +64K RAM for Apple IIe™ guar. compatible #80COLR $39

HOW TO ORDER: Order by phone or mail, pay by MC/Visa, Amex, Discover/COD (no addt'l charge for credit cards), send check with order, or COD ($3 addt'l). Minimum order $20. UPS Shipping/Handling add $3 Canada, FPO APO's, or PO Box numbers include $6 shipping handling. All orders must include daytime phone number. (We can ship open acct to schools, min order $100 Call 617 868-5515 for school orders.) Massachusetts residents add 5% sales tax. 30-day money-back satisfaction guarantee!

UNITECH 24-Z Thorndike Street Cambridge, MA 02141-1882 In Mass (617)868-5510

24 hours-a-day 7 days-a-week!

(800) 343-0472

AN OPPORTUNITY UNLIKE ANY OTHER

The nation's largest computer camp offers all traditional camping activities and camaraderie in a beautiful setting. Your child will have exclusive use of a major brand microcomputer for at least 6 hours every day.

An experienced staff ratio of one to three and a computer ratio of one to one uncaps the creativity of young people. Students receive hands-on experience in robotics, graphics, lasers, sound, languages, telecommunications and more.

Complete details on the 1, 2, 4, and 8 week coed sessions for ages 8-18 are available in a free brochure. Call or write for yours!

Call (317) 297-2700 or write to
MIDWEST COMPUTER CAMP
9392 Lafayette Road, Unit C5, Indianapolis, IN 46278

All programs listed in this magazine are available on the GAZETTE Disk. See details elsewhere in this issue.

advertiser's index

Reader Service Number/Advertiser	Page
102 Abacus	53
103 Acorn of Indiana	71
104 ActionSoft Corp.	2–3
105 Activision, Inc.	13
106 Activision, Inc.	15
107 American International Computer Products	115
108 Aprotek	43
109 Aprotek	112
110 A. T. & T. Liquidators	71
111 The Avalon Hill Game Company	9
112 Berkeley Softworks	18–19
113 Berkeley Softworks	21
114 Berkeley Softworks	23
115 Blackship Computer Supply	124
116 CAMERICA Sales & Marketing Corp.	11
117 Cardinal Software	118
118 Central Point Software	40
119 Cheatsheet Products, Inc.	122
120 C-More Products	116
C.O.M.B. Direct Marketing	110
121 Compumed	120
122 CompuServe	37,39
123 ComputAbility	106–107
124 Computer Centers of America	123
125 Computer Mail Order	109
126 Computer Mart	121
127 Covox, Inc.	120
Crown Custom Covers	124
128 CSM Software	116
129 Digital Solutions, Inc.	BC
130 Digital Solutions, Inc.	131
131 Electronic Arts	IFC
132 Electronic One	71
133 Emerald Components International	114
134 EPYX	7
135 EPYX	41
136 Federal Hill Software	112
137 Free Spirit Software	122
138 In ConTrol Inc.	47
139 Intelligent I/O	112
140 Jameco Electronics	118
141 Jason Ranhéim	120
142 Lyco Computer	48–51
143 Maxi Math	110
144 Maxtron	77
McGraw-Hill Continuing Education	33
145 Micro Computer Services	81
146 Midwest Computer Camp	132
147 Montgomery Grant	113
148 Origin Systems Inc.	IBC
149 Precision Data	85
150 Pro-Tech-Tronics	62–64
151 Protecto	55–57
S & S Wholesalers	45
S & S Wholesalers	61
S & S Wholesalers	116
Schnedler Systems	124
Second Source Engineering	77
152 Skyles Electric Works	117
153 Soft Byte	74
154 The Soft Group	130
155 Software Discounters of America	111
156 Strategic Simulations, Inc.	4
157 subLOGIC Corporation	31
158 Superior Micro Systems, Inc.	124
TCO Software	118
Tektonics Plus, Inc.	114
159 Tenex Computer Express	119
160 Timeworks, Inc.	1
161 Timeworks, Inc.	35
162 Triad Computers	108
163 Tussey Computer Products	27–29
164 Ultrabyte	47
165 Unitech	132
166 Utilities Unlimited	114

Classifieds	131
COMPUTE! Subscription	17

COMPUTE!'s GAZETTE
FREE Reader Information Service

Use these cards to request FREE information about the products advertised in this issue. Clearly print or type your full name and address. Only one card should be used per person. Circle the numbers that correspond to the key number appearing in the advertisers index.

Send in the card and the advertisers will receive your inquiry. Although every effort is made to insure that only advertisers wishing to provide product information have reader service numbers, *COMPUTE!'s GAZETTE* cannot be responsible if advertisers do not provide literature to readers.

Please use these cards *only* for subscribing or for requesting product information. Editorial and customer service inquiries should be addressed to: *COMPUTE!'s GAZETTE* P.O. Box 5406, Greensboro, NC 27403. Check the expiration date on the card to insure proper handling.

Use these cards and this address only for *COMPUTE!'s GAZETTE* Reader Information Service. Do not send with payment in any form.

COMPUTE!'s GAZETTE

102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118
119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135
136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152
153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169
170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186
187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203
204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237
238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	350	

Circle 350 for a one year new U.S. subscription to *COMPUTE!'s GAZETTE*: you will be billed for $24.

Please let us know. Do you own: plan to buy:

- ☐ Commodore 64 ___ ☐ 270 271
- ☐ VIC-20 _____ ☐ 272 273
- ☐ Plus/4 _____ ☐ 274 275
- ☐ Commodore 16 ___ ☐ 276 277
- ☐ Other _____ ☐ 278 279
- ☐ _____ h 280 281

Please print or type name and address.
Limit one card per person.

Name _____

Address _____

City _____

State/Province _____ Zip _____

Country _____

Phone _____

Please Include ZIP Code Expiration Date 6/30/87 GA587

ORDER A SUBSCRIPTION TO COMPUTE!'s GAZETTE.

For Fastest Service, Call Our **Toll-Free** US Order Line **800-247-5470**

☐ $24.00 One Year US Subscription
☐ $45.00 Two Year US Subscription

Name _____

Address _____

City _____ State _____ Zip _____

☐ Payment Enclosed ☐ Bill Me
Charge my ☐ Visa ☐ MasterCard ☐ American Express

Account No. _____ Exp. ___/___

Your subscription will begin with the next available issue. Please allow 4-6 weeks for delivery of first issue. Subscription prices subject to change at any time. Outside the U.S.A. please add $6 for each subscription.

J3391

Place
Stamp
Here

COMPUTE!'s GAZETTE Reader Service
P.O. Box 2161
Radnor, PA 19089

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 7479 DES MOINES, IOWA

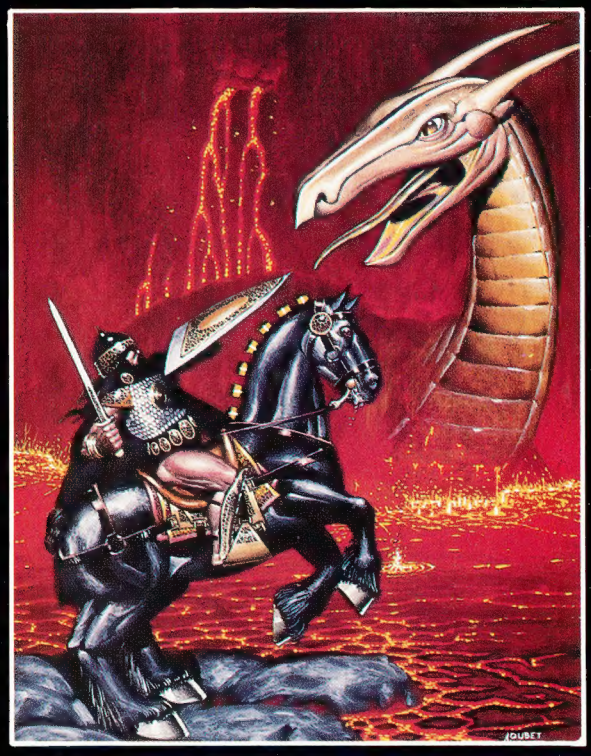
POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTE!'s GAZETTE
PO BOX 10957
DES MOINES, IOWA 50347

From Origin comes an all new version of the Computer Classic,

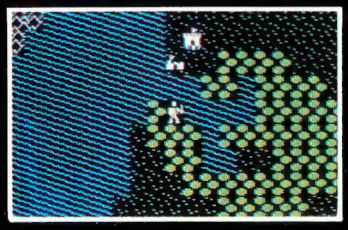
Ultima® I

Available on Apple®



It is a dark time. The evil Wizard, Mondain, sends forth relentless hordes of his daemonic minions to ravage the lands of Britannia. Thou art the one of whom the Prophets speak. The champion who will track Mondain deep into the darkest depths of the earth, to the farthest reaches of space and time, to vanquish this immortal foe.

The original **Ultima®** I was a pioneering product that established new standards in fantasy role-playing games and started what has become the best selling saga in the history of computer gaming. Now, Origin Systems brings you the new **Ultima®** I, completely rewritten in assembly language and employing state of the art graphics.

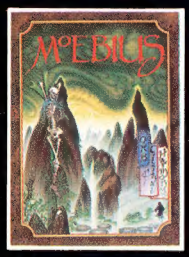


Journey back to the First Era of the Dark Ages and embark on the original quest of the **Ultima®** chronicles.

ORIGIN SYSTEMS INC. 340 HARVEY ROAD, MANCHESTER, NH 03103 (603) 644-3360

AUTODUEL™ is a futuristic fast-paced strategy role-playing game where the right of way goes to the biggest guns.

RING QUEST™ is a graphic adventure where you must traverse a land fraught with perils in order to put an end to the havoc caused by the Ring of Chaos.

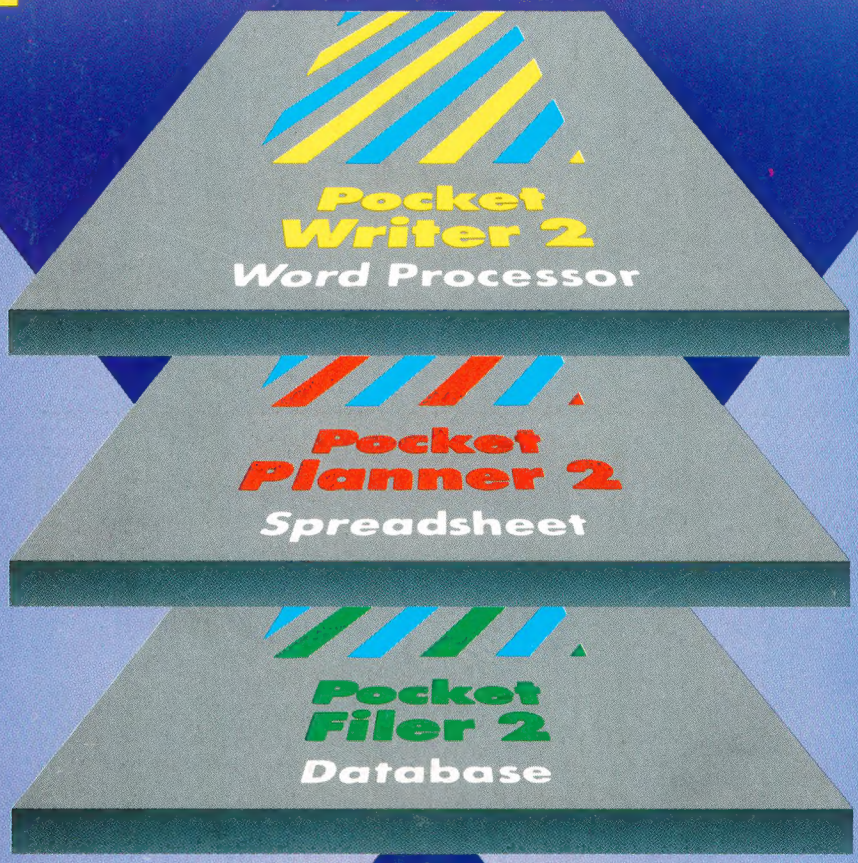


MOEBIUS™ takes you through the elemental planes of a colorful Oriental world of fantasy and adventure in search of the Orb of Celestial Harmony.

OGRE™ is a strategy game fought on the nuclear battlefield of tomorrow as an inhuman juggernaut Cybertank battles conventional forces.

Ultima® is a registered trademark of Richard Garriott/Ring Quest™ is a trademark of Origin Systems, Inc./Moebius™ is a trademark of Greg Malone/Ogre® and Autoduel® are registered trademarks of Steve Jackson Games, Inc./Apple™ is a trademark of Apple Computer, Inc. Authors wanted. Call us today.

Super Solutions 2



The Best Just Got Better

We just did something only the best can do! We made our award winning* software for the Commodore™ 128 and 64 computers even better!

Introducing... Pocket Writer 2/word processor **Pocket Planner 2**/spreadsheet **Pocket Filer 2**/database

Our new Pocket 2 series offers features usually found only in much more sophisticated applications software. Features that include: compatability with the new GEOS operating system†, ability to work with the Commodore RAM expander to allow a RAM disk, mouse support with pull down menus, 1571 burst mode for faster file loading, increased support for two single disk drives, automatic configuration for screen color, format and printer selection†.

Sophisticated software, yes, and still easy to use. You can be up and running in under 30 minutes even if you haven't operated a computer before.

Now, when you upgrade your Commodore™ 64 to a 128, Pocket software helps make it a breeze. The new Pocket 2 software has both 128 and 64 applications on the same disk. So when you buy one you are actually buying two software packages. The cost only $59.95 (U.S.).

Serious Software That's Simple to Use

You can buy all three Pocket 2 applications, Pocket Writer 2, Pocket Planner 2 and Pocket Filer 2 in one convenient Superpak for the low price of only $99.95 (U.S.). A super way to discover all the integrated features of Pocket 2 software and save almost eighty dollars.

As a companion to Pocket Writer 2, a **Dictionary Disk** containing 32,000 words (expandable to 40,000) is available. The cost $14.95 (U.S.).

For those of you who have already discovered the many benefits of owning Pocket software; we offer all registered owners upgrade Pocket 2 software for only $19.95 (U.S.) plus 3.00 (U.S.) shipping and handling! Available only by writing to Digital Solutions Inc.

*Commodore's Micro-computers Magazine, independent reviewers, rated the original Pocket Writer 128/64 and Pocket Planner 128/64 software the "Annual Best of 1986" in the productivity category.

International Distributor Enquiries to:

Digital Solutions Inc.

2-30 Wertheim Court
Richmond Hill, Ontario
Canada L4B 1B9
Telephone (416) 731-8775
Telex 06-964501
Fax (416) 731-8915

Superpak: The Solution That Saves Money!

Economical; $179.85 (U.S.) worth of software for only **$99.95 (U.S.)**

Canadian Dealer Enquiries:
Ingram Canada Ltd.
1-416-738-1700

Mail orders:
Crystal Computer Inc.
in Michigan
1-517-224-7667
outside Michigan
1-800-245-7316

Commodore is a registered trademark of Commodore Business Machines Inc.
†Features available for Commodore 64™.
©1986 Digital Solutions Inc.

Made with love by

RetroMags

20+ Years

Our goal is to preserve classic video game magazines so that they are not lost permanently.

People interested in helping out in any capacity, please visit us at retromags.com.

No profit is made from these scans, nor do we offer anything available from the publishers themselves.

If you come across anyone selling releases from this site, please do not support them and do let us know.

Thank you!